

Western Industry

April 1953

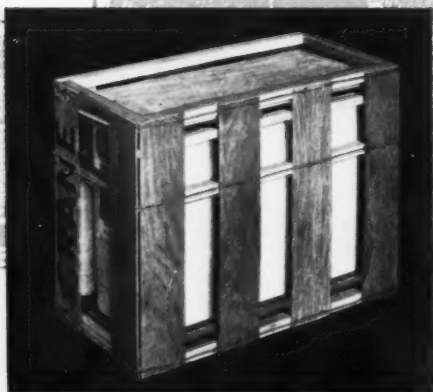
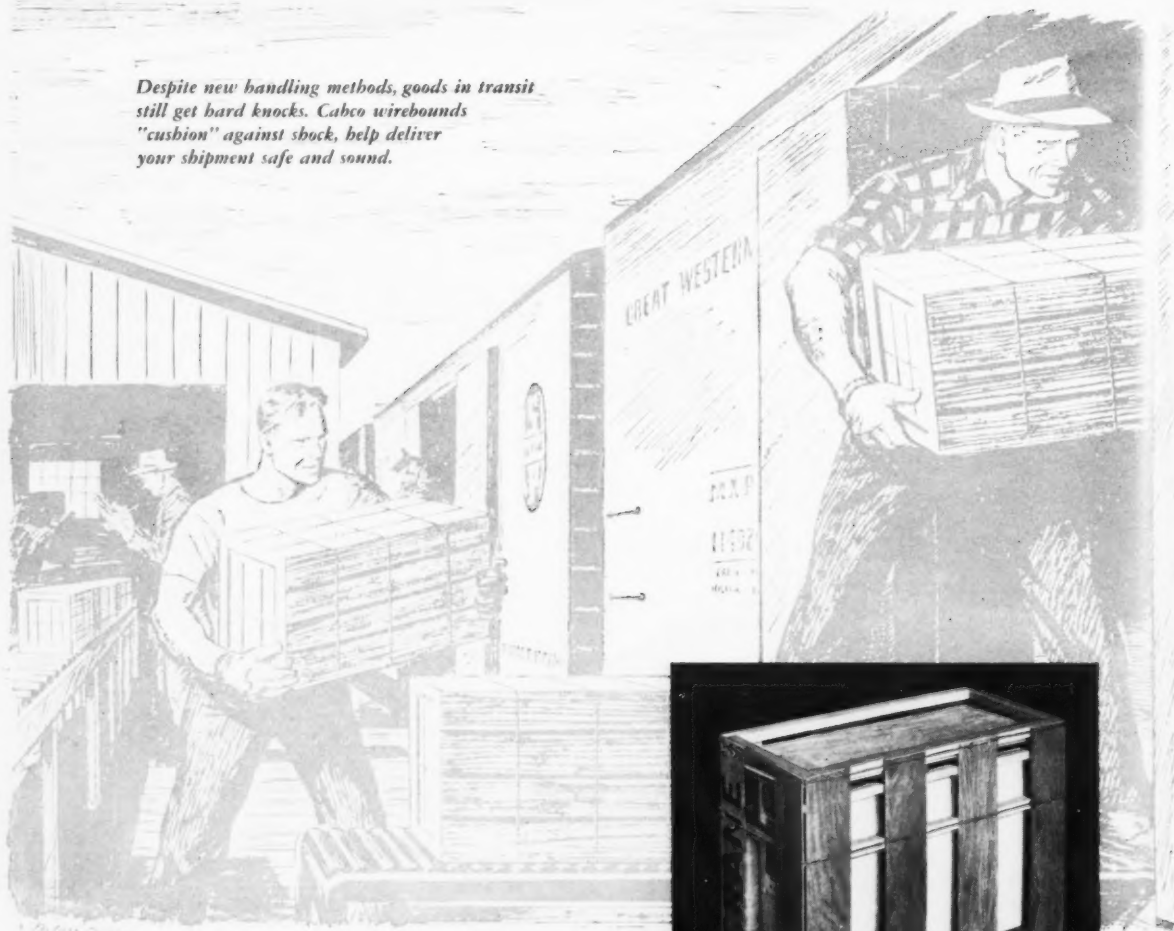
One-third of the entire national output of polystyrene used in plastics production is consumed by the Western plastics industry. The moulding press shown here in the plant of a pioneer in Western plastics development is making adding machine covers . . .
page 30



ENGINEERING THE JOB

- ➡ *for practical sub-assembly design . . . page 33*
- ➡ *for related steps in bulk materials handling . . . page 37*

Despite new handling methods, goods in transit still get hard knocks. Cabco wirebounds "cushion" against shock, help deliver your shipment safe and sound.



You get more from CABCO

...the West's foremost designer and manufacturer of wooden shipping containers

"Give" and "take" are essential ingredients of Cabco containers. There's more "give"—more *resiliency*—to absorb shocks, protect produce and manufactured goods. And there's more "take" where punishment is concerned. All because Cabco has made a lifetime study of wooden shipping containers—because we control every manufacturing step from our timber-stands to the finished container. Add to this streamlined "one-company" production system the design experience of Cabco engineers, and it's easy to see why you get *more* from Cabco!

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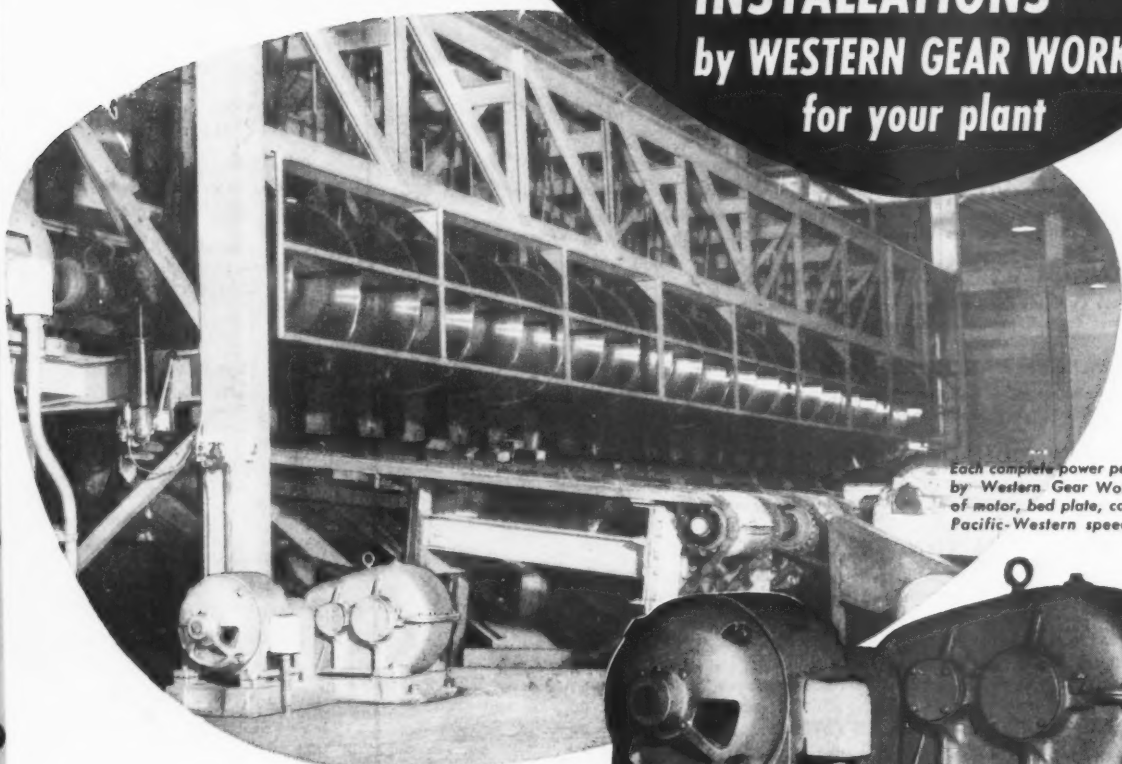
LEADING PLUMBING MANUFACTURERS ship tanks, bowls, lavatories—even tubs and heavy shower bases in wooden wirebounds. Wire-bound containers are light weight, yet offer superior protection, cushion travel shocks because of inherent "flex" action, sturdy construction. They permit high stacking in warehouse, and palletize or handle easily with lift or hand truck. Open construction permits quick identification of contents.

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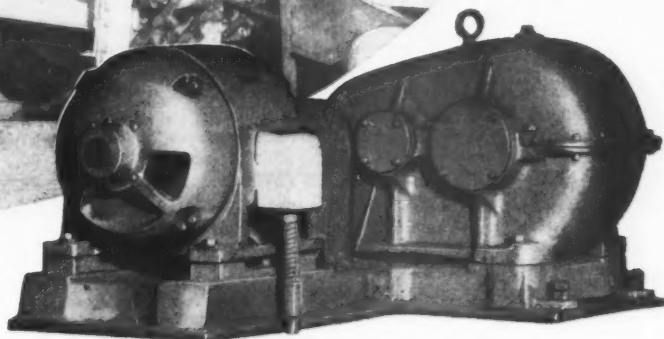
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CONTENTS

APRIL • 1953

Volume XVIII, Number 4

ARTICLES

- ANOTHER LESSON IN PRODUCTION CONTROL 33**
Modern production control methods adapted to small shipbuilding. This San Diego shipyard utilizes a practical sub-assembly design in its engineering.
- BULK MATERIALS HANDLING SOLUTION 37**
How Culligan Zeolite solved problems of handling power sweeping, temperature control, gentle handling, corrosion resistance, and purification.
- STREAMLINED WAREHOUSE HANDLING 41**
New central stores building at Hanford plutonium works solves consolidation and disbursement problems for a thirty warehouse system.
- NEW ADAPTATIONS OF MAGNESIUM WELDING 44**
New adaptations meet structural and electrical soundness requirements for high speed antennas on airborne radar equipment where lightness counts.
- AIR POLLUTION MAINTENANCE CONTROL 48**
Be sure your dust collector is collecting the dust. No plant shut-down due to failure of system if thorough periodic inspection is provided.
- LACK OF THOUGHT LIGHTS WESTERN FIRES 56**
Failure of watchmen, inadequate water supply, special hazards, faulty pumps, and untrained employees all contribute to disastrous industrial fires.
- M-H FEED TRUCK CONVEYOR SYSTEM 66**
An efficient, built in conveyor system eliminates manual handling and expedites direct delivery of bulk feed and related materials.
- PREPARING A SAFETY CODE 72**
Here's how one Western firm prepared and utilized a safety code based on the premise that well informed employees are the safest employees.

DEPARTMENTS

Editorials	20
Letters	22
Calendar of Meetings	26
This Month's Cover	30
Books for Industry	78
Helpful Literature	79
New Materials and Equipment	87
Westerners at Work	101
Associations Elect	105
News of Distributors and Salesmen	106
Classified Advertising	109
The West On Its Way	111

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Editor

A. C. PRENDERGAST

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Salt Lake City 1, Utah

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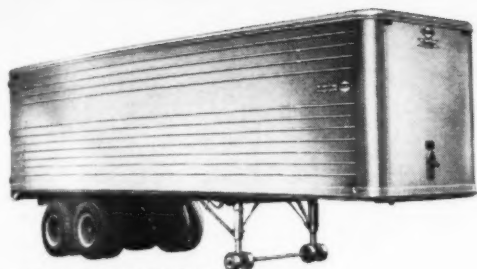
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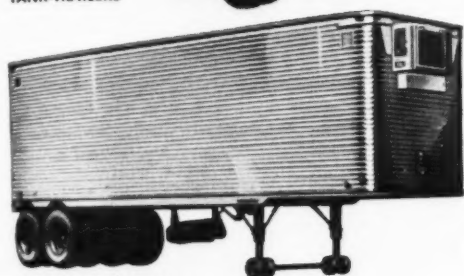
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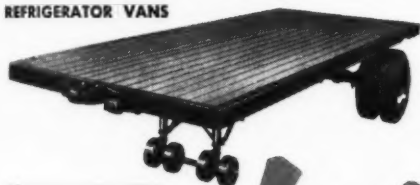
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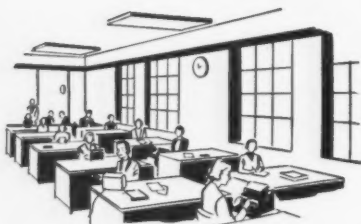
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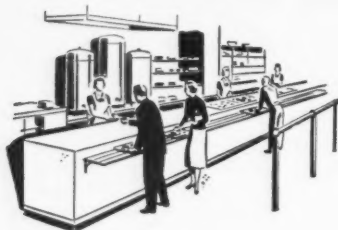
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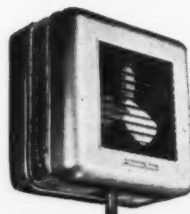
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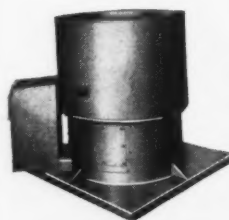
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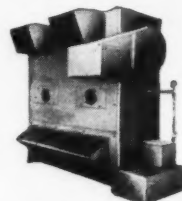
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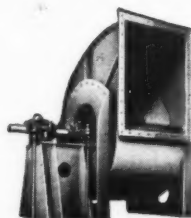
Unit Heaters



Roof Ventilators



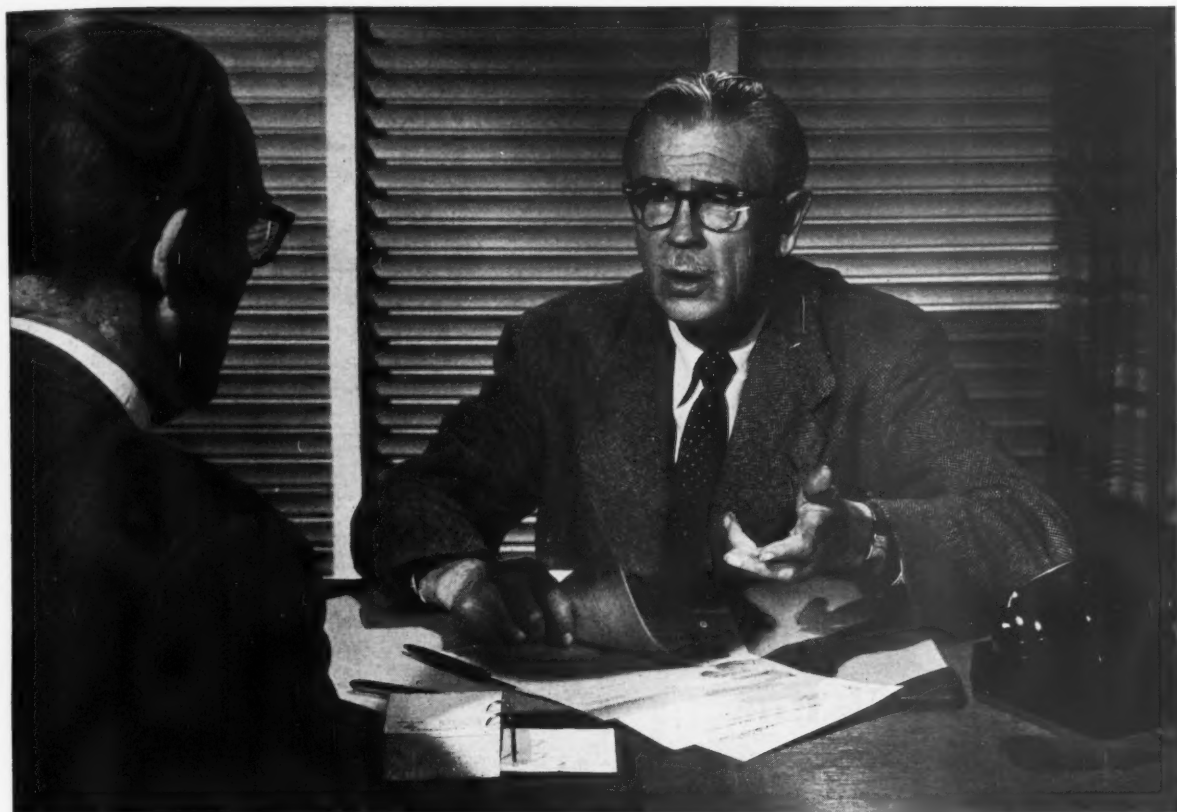
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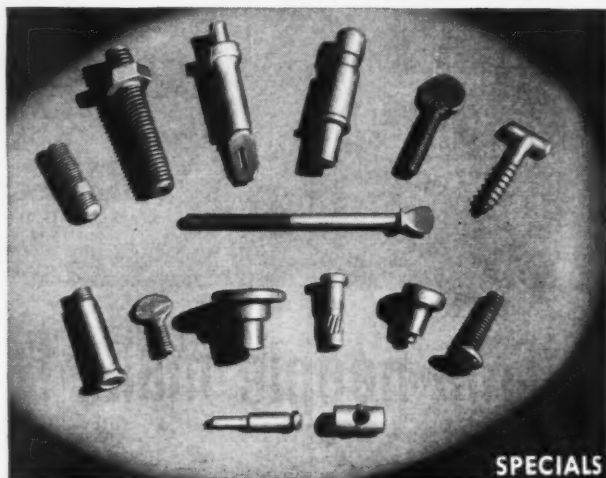
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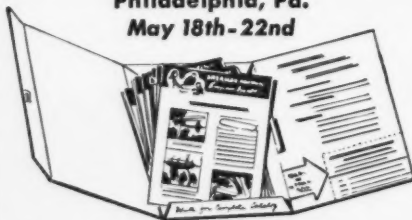
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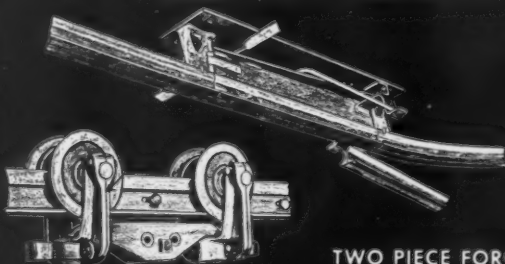
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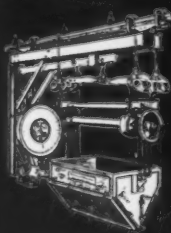
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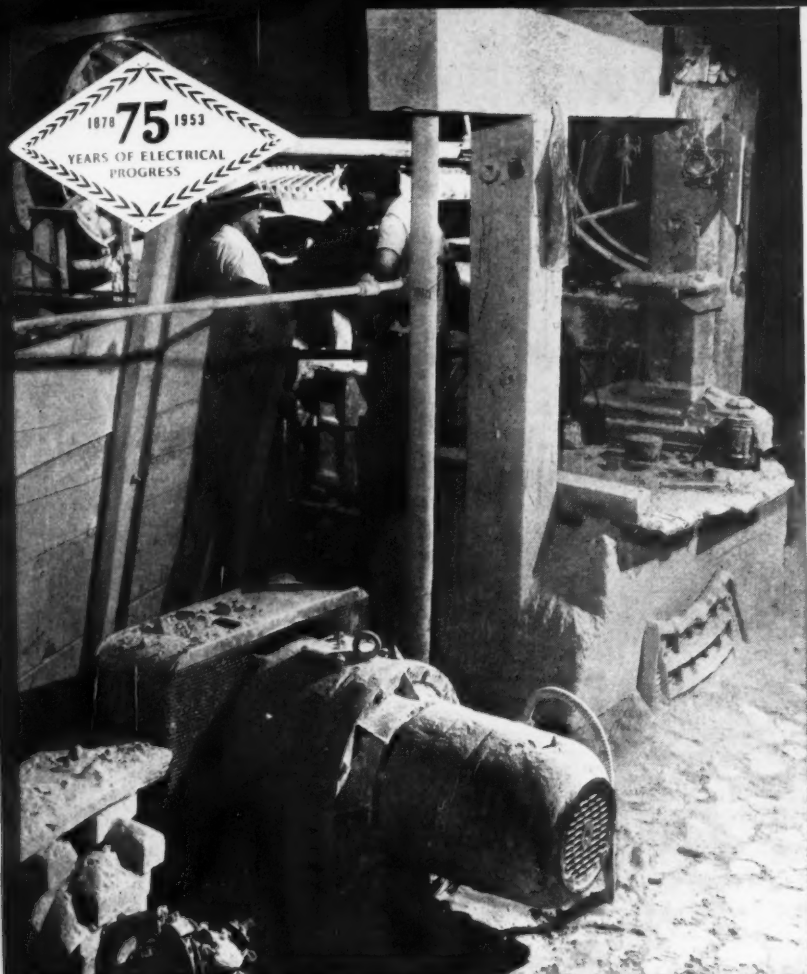


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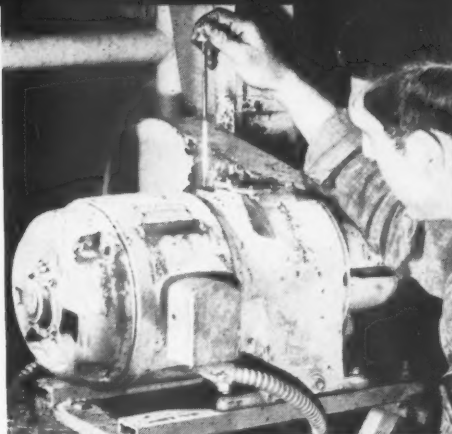
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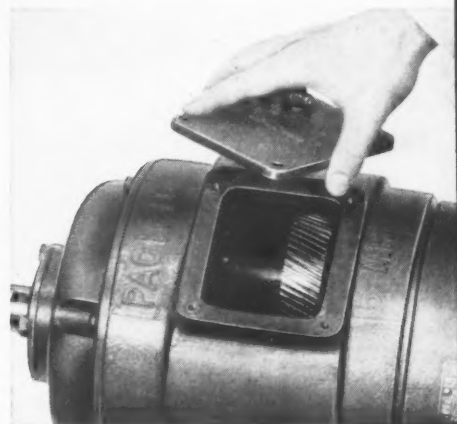
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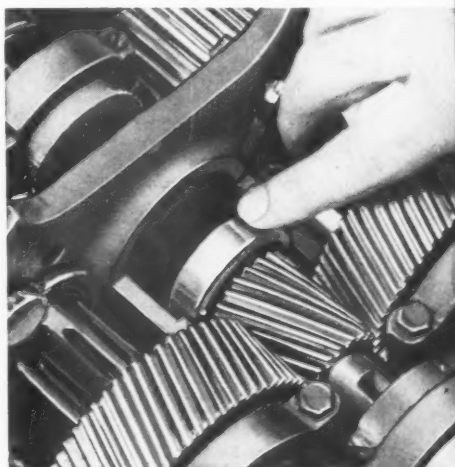
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**Less Cost per Unit of the Product
You Produce**



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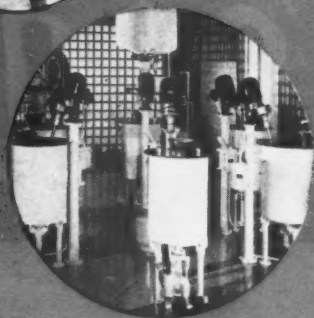
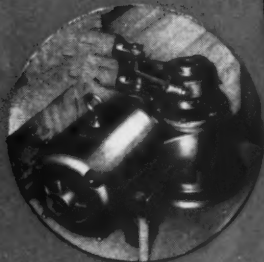
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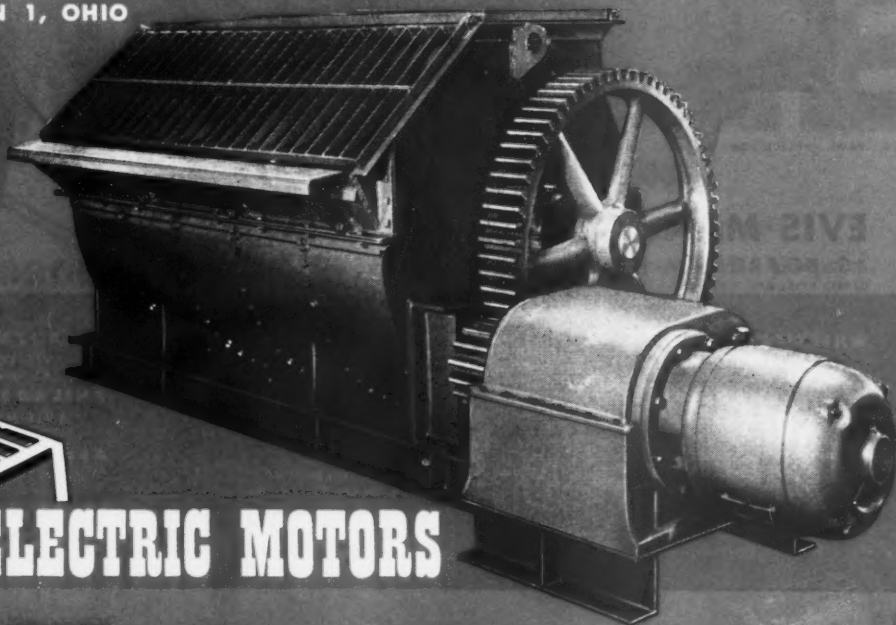
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*AmForge Upset weight—12 lbs.
—saved 66% in machining time!*

Our customer switched from turning this piece out of bar stock weighing 30 lbs. to AmForge upset and now gets forging as shown, saving stock, freight and 66 per cent of the machining time. The square forged hole fits his gauge without machining for maximum savings.



in material

*AmForge Upset saved
\$14,000 in material alone!*

AmForge piercing and forging of this rear axle housing saved our customer 340 tons of steel on an order for 136,000 units. He also saved freight on this tonnage and reduced machining to a minimum. This is an example of how AmForge cuts costs, gives you better quality.

*through modern metallurgy applied to the
latest upset and press forging methods at*

AMFORGE

AMFORGE's new Upset and Press Forging facilities at
Azusa, California, utilize the latest in forging techniques.



To see how AmForge can help you, send a blueprint,
sketch or sample unit for engineering study—
no obligation, of course.

AMERICAN

Brake Shoe

COMPANY

AmForge Division

109 N. WABASH AVENUE, CHICAGO 2, ILLINOIS

PLANTS: AZUSA, CALIFORNIA • CHICAGO, ILLINOIS



“Hold it!”

What does he mean, “Hold it”? Anyone can see the smoke! What the firemen on the truck don’t know is that an automatic sprinkler system has already extinguished the fire before the flames had a chance to spread. All that’s left of the fire is the charred, smoldering remains in a container used for oily rags.

It happens every day. But so do *disastrous fires* — in factories, warehouses, stores, hotels, hospitals and schools where there is no Grinnell Automatic Sprinkler System to keep the flames from spreading.

The time to act on Grinnell Protection is *now* — before fire burns you out, or cripples your business. Grinnell Sprinklers stop fire at its source, wherever and when-

ever it strikes, night or day, with automatic certainty. Seventy-five years experience proves this.

Consider the cost of fire

No indemnity check can take the place of hard-to-get equipment. No indemnity check can replace burned-out records. No indemnity check can bring back lost customers, or skilled workers who have strayed to other jobs.

If you have fire insurance, you’re probably paying for Grinnell Fire Protection anyway. So why not have it? A Grinnell Sprinkler System often pays for itself in a few years through reductions in insurance premiums. Grinnell Company — manufacturing, engineering and installation of automatic sprinklers since 1878.



Grinnell Company



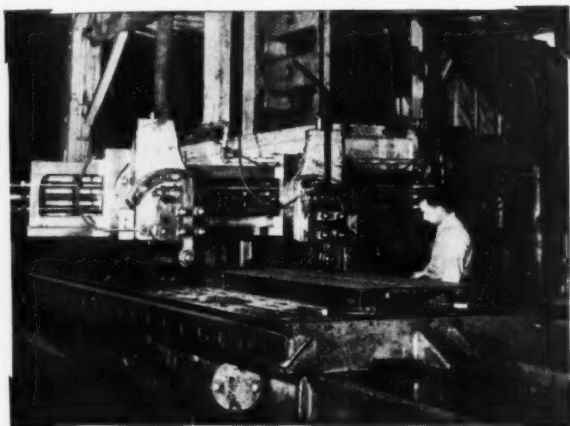
GRINNELL
FIRE PROTECTION SYSTEMS

Western Fire Protection Offices: Denver • Fresno • Los Angeles • Portland • Sacramento • San Francisco • Seattle • Spokane

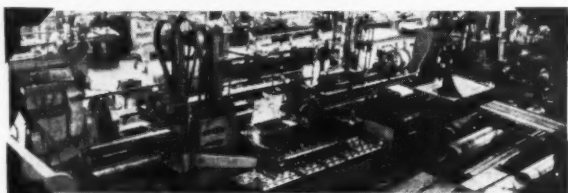
STANDARD ENGINEER'S REPORT

LUBRICANT	DATA <i>Calol Vistac Oil</i>
UNIT	<i>72" open-side planer</i>
OPERATION	<i>Machining heavy-duty metal parts</i>
CONDITIONS	<i>Extreme pressures</i>
PERIOD	<i>4 years</i>
FIRM	<i>Lamb-Grays Harbor Co., Hoquiam, Wash.</i>

Tacky oil on planer ways assures precision work!



WHEN CALOL VISTAC OIL replaced another lubricant on the main ways of this 72" open-side planer, its constant, even film helped to assure truer cuts for the Lamb-Grays Harbor Co., Hoquiam, Wash. Previous oils used by the company had gummed quickly, left deposits on ways, and seriously affected precision.



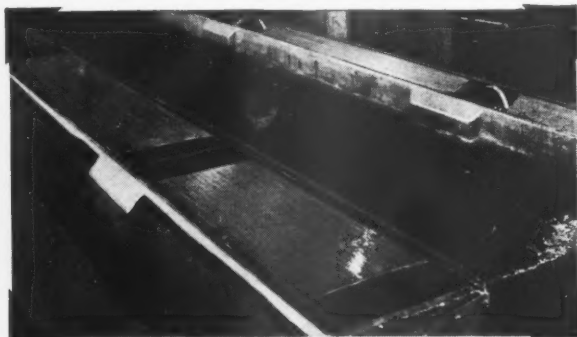
"NO TROUBLE OF ANY KIND" is the report from Lamb-Grays Harbor Co. since they changed to Calol Vistac Oil in 1948. Calol Vistac Oil is also used in reduction gears, motor heads, air-tools, and heavy-duty plain bearings. It comes in several grades and may be applied by wick-, ring-, or drip-feed oilers.



FREE CATALOG: "How to Save Money on Equipment Operation," a new booklet full of valuable information, is ready for you. Write or ask for your free copy today.

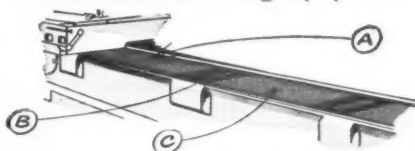


TRADEMARK "CALOL" REG. U.S. PAT. OFF.



THE PRESSURE-RESISTANT FILM of Calol Vistac Oil stays on the ways even under extreme loads. For example, when work weighing up to $7\frac{1}{2}$ tons was carried on the 10-ton bed of this planer, the "high-oiliness" film did not squeeze off, despite the $17\frac{1}{2}$ ton load.

How Calol Vistac Oil Cuts Costs on Metal-Machining Equipment



On machine ways, in hoist gear sets, motor gear-heads, air hammers, heavy-duty plain bearings—stays put and saves wear because of viscous, tacky nature. Atomizes quickly and stays fluid at low temperatures.

- A. Special additives help form oily, pressure-resistant lubricating film...won't run off slow-moving parts.
- B. Economical—small quantity will lubricate efficiently, dissipate heat.
- C. Tenacious film cuts power loss and wear.

STANDARD TECHNICAL SERVICE checked this product performance. For expert help on lubrication or fuel problems, call your Standard Fuel and Lubricant Engineer or Representative; or write Standard Oil Company of California, 225 Bush St., San Francisco.

STANDARD OIL COMPANY OF CALIFORNIA

HEAVY STEEL BEAMS are unloaded and stacked, then lifted and carried as needed by the Allis-Chalmers HD-5G Tractor. Maximum stacking height beneath lift fork is 8 ft. 10 in.



MODERN HANDLING with A-C Tractor Shovel Helps Turn Out NEW HOME EVERY HOUR



Up in Port Washington, Wisconsin, the Houses Division of the Harnischfeger Corporation is doing its part to relieve the nation's housing shortage by building a new prefabricated home every hour. The company also is assisting the nation's defense effort by turning out hundreds of barracks for the armed forces — and doing the job fast.

Modern yard-handling methods that employ an Allis-Chalmers HD-5G Tractor and interchangeable front-mounted attachments help make this fast production possible. With lift fork the tractor moves and stacks lumber, lifts steel columns and I-beams, keeps the production line supplied with materials as needed. With shovel and dozer blade it maintains plant roadways, develops parking areas, removes ash from plant furnaces, quickly clears away snow so that there is no interruption in deliveries or yard work. The tractor has proved to be a "real multi-purpose machine," according to the plant manager.

The HD-5G is being used in developing an adjacent six-acre tract, and is also used for various jobs at a second Harnischfeger plant about four miles away. It is easily transported between plants on a low-boy trailer.

See your Allis-Chalmers dealer or write for more information on how materials handling may be speeded up around your plant with the HD-5G — or one of the three larger models with up to 175 net engine hp., 61,600 lb. weight and 4-yd. standard bucket or 7-yd. light materials bucket.

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.



NEW PARKING LOT IS BUILT by the HD-5G. It excavates, levels, handles all kinds of bulk materials, clears away snow with 1-yd. standard bucket or dozer blade.



LUMBER IS CARRIED into factory several tons at a time. With 40 drawbar hp. and 16,200 lb. weight, the HD-5G has both weight and power to handle big loads easily.



NATIONAL FAVORITE for handling Heavy Loads... Buy the best—now built in the WEST!

Move your materials "thru-the-air" . . . over floor congestion — with the P&H Trav-Lift. It's the swift, safe one-man way to lift, transport and stack loads up to 15 tons *without* rehandling.

Only P&H builds the Trav-Lift . . . and it's now built in the West. It's custom made to your specific needs from standard cost-saving designs. You get the traditional P&H safety factors — all the P&H quality features that mean longer, finer performance. Capacities to 15 tons with various spans and lifting speeds, floor or cage control.

handle it "thru-the-air" at lower cost

P&H PACIFIC DIVISION
HARNISCHFEGER
CORPORATION

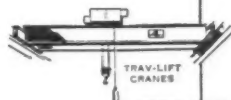
2400 East Imperial Highway, Los Angeles 59, California

Branch Offices: Denver 2 — 1108 15th St.
San Francisco — 100 Bush St. • Seattle 4 — 2909 First Ave., South
Los Angeles 59 — 2400 East Imperial Highway

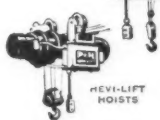


NEW P&H PACIFIC PLANT ANSWERS YOUR NEEDS

We invite you to visit P&H's new Pacific Division plant, now in full production. Here, in addition to the manufacture of Cranes, are complete sales and service facilities. Let our materials handling engineers assist with your problems. P&H is America's leading builder of overhead handling equipment.



TRAV-LIFT
CRANES



ZIP-LIFT
HOISTS



HEAVY DUTY
CRANE

POWER SHOVELS • CRAWLER AND TRUCK CRANES • OVERHEAD CRANES AND HOISTS • ARC WELDERS AND ELECTRODES • SOIL STABILIZERS • DIESEL ENGINES • PRE-FABRICATED HOMES



EDITORIALS

Additional service to our readers

WESTERN INDUSTRY is distinctly different from national magazines in the general industrial field, in that we are not exclusively devoted to discussing better operating methods and practices. We have an additional function, that of reporting and analyzing the trends of the Western industrial economy, which is in a state of growth not duplicated elsewhere.

Our national contemporaries have no occasion to pay continual attention to this situation, but to the readers of *Western Industry* the impact of our great population growth on the industrial economy of the West is something of prime importance.

"The West On Its Way" section of *Western Industry* is a continual reminder to our readers of the multitude of changes that are taking place. In order to provide additional perspective, the first page of this section is now being set aside for analyzing some of the significant overall aspects of Western development. In this issue there will be found on that page some "hot news" from the Census Bureau, namely the "value added" figures for 1951 for the Survey of Manufactures.

These figures show that we have had a far greater percentage gain in manufacturing production than the rest of the country; also that we have a slightly larger share of the total national output than in 1947. Our vastly greater percentage gain means that our industrial economy has been far more affected in the post-war period than has that of the country as a whole.

The fact that aircraft and lumber are the two outstanding contributors to the increase in "value added by manufacture" since 1947 in the West is viewed by some as a weakness which could make us vulnerable to a recession. We do not subscribe to that view. The principal market for lumber is in construction, and since there is no apparent reason for any diminution in the West's population growth, it is hard to see how lumber or other wood products can suffer more than temporary upsets. As merely instruments of warfare, aircraft may easily be an industrial liability when international difficulties smooth out. On the other hand, aircraft production may be considered in the light of a laboratory, training school and workshop for industrial techniques and processes whose peaceful uses on a vast scale we may yet be unable to perceive.

Just about time

IT CERTAINLY was time for a change in Washington. We noticed the other day that a \$10 bill, bearing John W. Snyder's signature as Secretary of the Treasury, carried an engraving of the Treasury Department with a Model A Ford as the sole occupant of the street in front of the building. Perhaps the Model A was driving up to take Secretary Snyder back to private life, which may have been the justification for its appearance.

Recognizing our own talent

SOMETIMES it is a bit disheartening to read through program after program of national professional and trade conferences and find no Westerners at all represented on them. Consequently it perked us up considerably a few weeks ago to hear this observation, "When it comes to electricity, the West thinks in terms of the future, the Midwest in terms of the present, the East in terms of the past."

We are in no position to vouch for the accuracy of this assertion, since no supporting details or evidence were given. But it is reasonable to assume that a younger industrial economy such as ours can be pioneering many engineering practices in which we do not need to take a back seat for anyone.

There is a tendency, we feel, to underrate some of our Western professional talent, and we believe that program committees right here in the West need not think that success in their job depends upon the number of "big names" they can import from elsewhere.

The last two professional divisions conferences of the San Francisco section of ASME, devoted to chronicling Western engineering contributions to the development of industry in the West, are significant steps in recognizing Western engineering achievements. Let us have more recognition.

CASE HISTORY

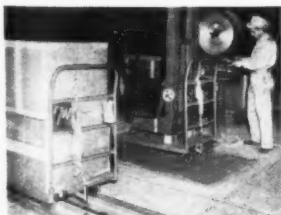
REDUCES ERRORS
in routing to the
vanishing point for
T.I.M.E. incorporated
(The Intercity Motor Express)



No duplicate handling—Conveyor car is loaded, checked and routed right inside incoming motor truck. No further checking is necessary. Unloading of conveyor cart into outgoing truck accomplished the same way.



Confusion eliminated—Loads are recirculated in a rectangular path until ready for loading. Noise and confusion are virtually eliminated. Any load may be pulled off for weighing.



Instant hook-up. Conveyor carts or hand trucks hook onto the conveyor line when an engagement pin is dropped through the floor slot. To disconnect, pull the chain connected to the pin; cart may then be wheeled off the line.

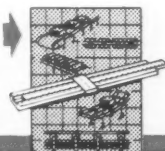


The underfloor chain of the Webb Towveyor pulls trucks or carts through plant.

Webb Towveyor *increases handling capacity 20%*

MORE FREIGHT PER DAY is handled by fewer employees with this Webb-engineered Towveyor. Hand trucks are hooked onto a constantly moving conveyor chain through a narrow slot in the floor to carry a steady flow of freight from unloading dock to loading dock. Webb conveyors, both floor and overhead types—are adaptable to any materials handling problem. They are engineered, manufactured and installed by Webb of California. In your own plant Webb may be able to help you save greatly on handling costs and working time.

A "MASTER PLAN" Engineering Consultation Service is offered to manufacturers to help plan production facilities. This permits systematic growth with enlargement of conveyor system in easy stages over a long period. Phone or write for particulars on the Webb "Master Plan" Service.



JERVIS B. WEBB
COMPANY OF CALIFORNIA

LOS ANGELES 23
2650 E. Washington Blvd., Kimball 6165
SAN FRANCISCO 14
2144 Market St., Klondike 2-2709
SEATTLE 99
1144 7th Ave. West, Alder 1777

LETTERS

Contributions to this column from our readers are welcome. Names will be withheld from publication if so requested. Unsigned letters, however, will be disregarded.

Good contacts

Editor, *Western Industry*:

I am pleased to know that you have been in touch with a number of our people as your magazine is of much interest and usefulness to us.

W. E. WASTE
Executive Vice President
Bechtel Corporation
San Francisco, California

* * *

Foresight appreciated

Editor, *Western Industry*:

Since I am a new reader of *Western Industry*, I missed the first three articles of the series entitled "The Learning Curve." I would appreciate having tear sheets of these three sent to me.

I would like to add my congratu-

tions to you on your foresight in printing articles on such important subjects.

ARTHUR C. LAUFER
Production Planner
Packard-Bell Company
Los Angeles.

* * *

Many thanks!

Editor, *Western Industry*:

Your magazine is certainly a fine publication, serving a most useful purpose.

A. C. RITTER
Assistant General Manager of
Properties
Union Pacific Railroad Co.
Salt Lake City, Utah.

* * *

Polite reprimand

Editor, *Western Industry*:

No doubt Alameda County would be glad to claim the new \$50,000,000 Ford assembly plant (WI, Feb. p. 102). The plant site, however, is very much in Santa Clara County, only seven miles north of San Jose. We don't want to be provincial about this, but golly, we have to register a complaint this time. We're growing mighty fast down this way both industrially

and population-wise, but not so fast we can give a huge industry to one of our very fine competitors.

BRUCE CRAVER
Manager, Industrial Dept.,
San Jose Chamber of
Commerce
San Jose, California.

* * *

Review & Forecast informative

Editor, *Western Industry*:

I read with interest the section of your Review and Forecast issue on meat packing, and enjoyed looking over other articles also. I have no suggestions for improvement of the meat statement, but the editor of that section might like to know that California now ranks first among all states in number of cattle slaughtered, and also in number of sheep and lambs slaughtered. Commercial slaughter of cattle in California in 1952 was a little over 10% of the United States total and slaughter of sheep and lambs amounted to 13½% of the national total.

As another suggestion, it might be worth noting in a future issue how much of the meat continues to receive federal grading. Grading of practically all meat was required during the period

CONTINUED ON PAGE 24

FOR AIR AND HYDRAULIC COMPONENTS AND SYSTEMS

...CONSULT RUCKER

**ELIMINATE DELAYS . . . ORDER FROM OUR LARGE IN-STOCK
INVENTORY OF NATIONALLY-ACCEPTED CONTROL VALVES,
PUMPS, COMPRESSORS, FLUID MOTORS, CYLINDERS,
ACCUMULATORS, REGULATORS, FILTERS, AND
OTHER ACCESSORIES**

Deal with the West's largest firm specializing in fluid power systems . . . complete engineering department and manufacturing facilities available for analysis, design and assembly. All our field men are experienced mechanical and chemical engineers, qualified to understand and discuss your needs. For help call our nearest office NOW.

—THE RUCKER COMPANY—

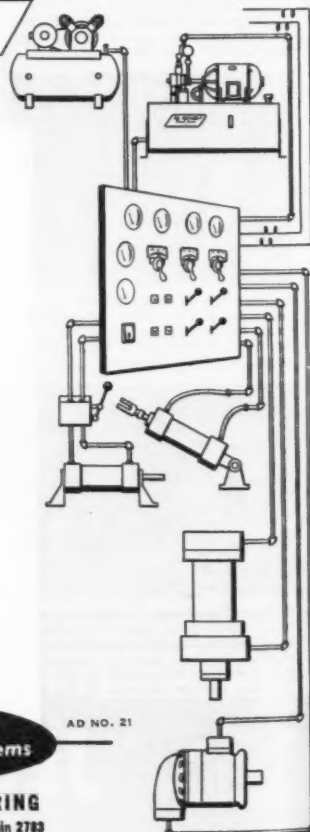
**Specialists in
Fluid Power Systems**

HYDRAULIC & PNEUMATIC COMPONENTS • ENGINEERING • MANUFACTURING

4856 Firestone Blvd., South Gate, Calif., Kimball 8271

White-Henry-Stuart Bldg., Seattle 1, Wash., MAIn 2783

4228 Hollis Street, Oakland 8, Calif., OLYmpic 3-8221



NOW! **2** NEW HYSTER® LIFT TRUCKS

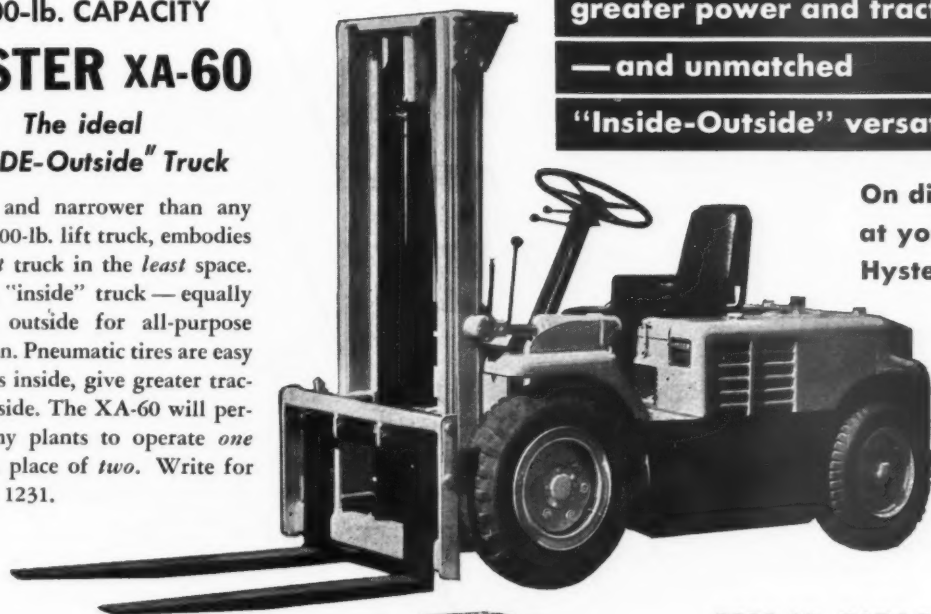
Extra-Rugged for "INSIDE and OUTSIDE" Work

6000-lb. CAPACITY

HYSTER XA-60

The ideal
"INSIDE-Outside" Truck

Shorter and narrower than any other 6000-lb. lift truck, embodies the *most* truck in the *least* space. A great "inside" truck — equally efficient outside for all-purpose operation. Pneumatic tires are easy on floors inside, give greater traction outside. The XA-60 will permit many plants to operate *one* truck in place of *two*. Write for Bulletin 1231.



Shorter, Narrower, Faster—with

greater power and traction

—and unmatched

"Inside-Outside" versatility!

On display
at your
Hyster dealer



8000-LB. CAPACITY

HYSTER ZA-80

The ideal
"OUTSIDE-Inside" Truck

Has long wheelbase, but SHORT OVER-ALL LENGTH — for smoother riding and high maneuverability. For use where most of work is *outside*, but truck is *also* required to work *inside* in close quarters. Extremely powerful, with tremendous traction, yet pneumatic tires assure maximum protection to floors. Write for Bulletin 1230.

HYSTER SALES COMPANY

2105 S. E. 7th AVENUE, PORTLAND 14, OREGON...Filmore 6741

HYSTER COMPANY

753 9th AVENUE N., SEATTLE 4, WASHINGTON....Elliott 2401

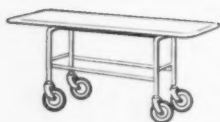
HYSTER COMPANY

4445 3rd STREET, SAN FRANCISCO 24, CALIF....Mission 8-0680

HYSTER COMPANY

5301 PACIFIC BLVD., HUNTINGTON PARK, CALIF....LOgan 3291

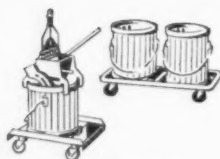
Be sure to get the whole Hyster "Inside-Outside" story before you buy any Lift Truck! Ask your Hyster Dealer, or write for Bulletins 1230 and 1231.



WHEEL STRETCHER
& HOSPITAL EQUIPMENT



DISH TRUCK



MOP TRUCKS



HAND TRUCK DRUM TRUCK



FOR GENERAL USE



FURNITURE TRUCK



KEG TRUCK

TRUCK Selection Chart



CANVAS BAG TRUCK



TANK TRUCK



PLATFORM TRUCKS



BOX OR CRATE
DOLLY MILK CRATE
DOLLY



REFUSE CAN
DOLLY



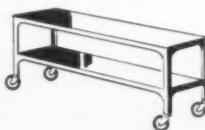
PIANO DOLLY



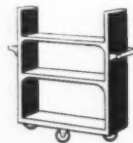
FURNITURE DOLLIES



LINEN SERVICE TRUCK



MARKING TABLES



SHELF STOCK TRUCK

COLSON TRUCKS

Colson Equipment & Supply Co.

LOS ANGELES 13

1317 Willow Street, TRinity 5743

OAKLAND 7

350 Tenth St., TEmplebar 2-3556

SAN FRANCISCO 5

20 Beale Street, GARfield 1-0280



"LIFT JACK" MATERIAL HANDLING SYSTEM



LOAD 'EM UP, JACK 'EM UP AND ROLL



STACK 'EM UP

LETTERS

CONTINUED FROM PAGE 22

of price controls that recently ended. Since February 6 federal grading is only voluntary. It will be interesting to note how much West Coast meat is federally graded this year.

HAROLD F. BREIMYER
Agricultural Economic Statistician
Division of Statistical and
Historical Research
United States Dept. of Agriculture
Washington, D. C.

* * *

Editor, *Western Industry*:

It is my personal opinion that you did an excellent job in your report on the mining industry in your annual Review and Forecast for the next year. However, perhaps it would be a good idea, in a concise report, to include the mineral industry of each Western state.

JOHN A. GARCIA
State Inspector of Mines
Albuquerque, New Mexico.

* * *

Editor, *Western Industry*:

I would like to acknowledge receipt of your January issue, and the story on page 104. I believe the story as written illustrates very well the radius in which Permanente Cement Company is able to ship cement.

WALLACE A. MARSH
Vice President and General
Manager
Permanente Cement Company
Oakland, California.

* * *

Editor, *Western Industry*:

I did enjoy your annual Review and Forecast number very much. It is certainly well done, and should be of definite value to industry of the West.

A. P. HEINER
General Traffic Manager
Kaiser Steel Corporation
Oakland, California

* * *

Editor, *Western Industry*:

I found the Review and Forecast number very interesting, and am sure the data will be of considerable use to our staff.

PAUL J. RAVER
Administrator
United States Dept. of the
Interior
Bonneville Power Administration
Portland, Oregon.

American Felt TREATMENTS GREATLY EXPAND FELT'S FUNCTIONS

Just see this list of the treatments that can be given to felt by American. They tremendously increase the usefulness and value of felt, giving it new and added qualities and advantages. Especially treated felt from American may be the answer to one or more of your problems associated with either your production or your product. Remember that felt is an engineering material, which can be specified as accurately as any other. It can be had in rolls, sheets or cut or formed parts to your exact specifications. American's Engineering and Research Department will gladly collaborate with your engineers, designers and production men. Write on your company letterhead for:

Data Sheet No. 4, Special Felt Treatments.

American Felt Company

TRADE MARK

GENERAL OFFICE

GLENVILLE CONN.

PACIFIC COAST: A. S. BOYD COMPANY
793 Eighth Ave., San Diego, Calif.

SALES OFFICES: New York, Boston, Chicago, Detroit, Cleveland, Rochester, Philadelphia, St. Louis, Atlanta, Dallas, San Francisco, Los Angeles, Portland, Seattle, San Diego, Montreal. PLANTS: Glenville, Conn.; Franklin, Mass.; Haverhill, N. Y.; Detroit, Mich.; Westley, S. L.—ENGINEERING AND RESEARCH LABORATORIES: Glenville, Conn.

Felt Treatment Selection Chart

TREATMENT INDEX

No. 1 Starch Base
No. 2 Starch Base
No. 3 Starch Base
No. 4 Starch Base
No. 5 Starch Base
Starch Base
Synthetic or Natural Resin Emulsions

Asphalt — Water Dispersed

Graphite — Water Dispersed

Paraffin — Petrolatum (Cut Parts Only)
Paraffin — Graphite - Petrolatum (Cut Parts Only)
Wax — Bee's - Carnarba - Candelilla - Paraffin (Cut Parts Only)

Natural Latex
Hycar Latex
Neoprene Latex
Buna-S Latex
Flame Resistance

Fungi Resistance
Flame and Fungi Resistance

Water Resistance
Moisture - Fungi Resistance

Vermin Resistance

Moth Resistance

Hycar Sheeting
Neoprene Sheeting
Buna-S Sheeting
Hycar Rubber Vistex
Natural Rubber Vistex
Neoprene Rubber Vistex
Buna-S Rubber Vistex
Aluminum Foil

Latex Rubber Surface Coating (One or Both Sides)

Rubber and Starch Sizing Coating

SIZING IMPREGNATIONS

DESCRIPTION
Slight Stiffening
Medium Stiffening
Stiff Size
Extra Stiff Size
Double Stiff Size
5% to 30% Dry Solids
5% to 30% Dry Solids

TREATMENT IMPREGNATIONS

Weather Sealing
Lubrication
Waterproof Sealing - Lubrication
Packing - Lubrication
Blocking - Sealing

5% to 100% Dry Solids
Flexible Stiffening, and strengthening
Felt treated to specification will not propagate a flame
Will not support fungus growth
Will not support Fungus Growth—Will not propagate a Flame
Minimum Water Absorption
Treated to Government Specification—Felt has Minimum Water Absorption and Will Not Support Fungus Growth
Felt non-attractive to insects

Resistant to carpet beetle larvae* ravage

LAMINATIONS

1/32" T and 1/64" T Impervious Septums Laminated to all Felt Densities
A Sheet, Laminated, Felt Base Packing, Sealing and Gasketing Material
Laminated to Pad Felts or Special "K" Felt

COATINGS

Reinforcement, non-skid
Stiff Reinforcement

TYPICAL USE

Coat Front Felts
Shoe, Tongue, and Pennant Felts
Millinery, Furrier, and Heel Pads
Hat Brims
Carnival Hats
Stiffening
Permanent Stiffening—Pre-Form Molding

Cowl Seals — Anti-Squeak Chassis Strips
Anti-Friction Lubricating Pads — Washers — Oil Seals
Float Valve Plunger Washers — Needle Lubricating Pads
Marine Stuffing Box Washers
Polishing Laps — Waterproofing

Backing Felts, Cushioning
Type of Latex used dependent on conditions of use
Aircraft and decorative felts, Clothes Dryer Felt
As required by conditions of use
Felts for Acoustical and Thermal Insulation
Weatherstripping
Tropicalization

Musical or Scientific Instruments, Case Lining Felt
Musical or Scientific Instruments, Case Lining Felt

Oil or Water Seals, The Impervious Rubber Sheeting Functions As a Positive Dam
Fuel Pump Packing Washers, Mechanical Seals for Corrosive Liquids, Oil Wipers, Shock Absorber Packing
Reflectant, Acoustical and Thermal Insulating Blankets

Reinforce low grade pad felts, non-skid typewriter pads, non-skid chair pads
Window Channel Felt

SAVE MONEY—as fast as you can...

Pull...Zip...Stick!



Labeling or marking costs can be reduced — by fully 50% — thru PEE-CEE the new printed self-adhesive (Scotch Brand) tape if you are:

- Changing prices
- Sealing packages
- Warning, instructing or coding
- Adding merchandising messages
- Indicating weights or contents
- Correcting package printing errors
- Showing specifications or diagrams
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CALENDAR OF MEETINGS

APRIL 21-22—*Pacific Coast Management Conference*, at the Claremont Hotel, Berkeley, Calif. Contact California Personnel Management Assn., 2180 Milvia St., Berkeley 4, for additional information.

APRIL 23-24—*American Association of Petroleum Geologists, Rocky Mountain Section*, Casper, Wyoming, annual regional meeting. Contact H. E. Summerford, chairman of exhibits, Box 279, Casper.

APRIL 24—*American Water Works Assn., California Section*, spring regional conference, Deep Well Ranch Hotel, Palm Springs.

APRIL 27-30—*Boiler Code Committee of American Society of Mechanical Engineers and National Board of Boiler & Pressure Vessel Inspectors*, joint meeting, Multnomah Hotel, Portland.

APRIL 27—*Forest Products Research Society*, Pacific Northwest section, hardboard division meeting at Eugene Hotel, Eugene, Ore. Contact A. L. Bonutto, Monsanto Chemical Co., 911 Western Ave., Seattle 4.

APRIL 28—*Forest Products Research Society*, Pacific Northwest section, general spring meeting at Eugene Hotel, Eugene, Ore. Contact A. L. Bonutto, Monsanto Chemical Co., 911 Western Ave., Seattle 4.

APRIL 29-MAY 1—*Electronics Components Symposium*, at the Shakespeare Club, Pasadena, Calif. Contact Dr. A. M. Zarem, Chairman of Executive Committee, Suite 1011, 621 S. Hope St., Los Angeles 17.

MAY 1—*Riverside-San Bernardino County Industrial Conference*, Mission Inn, Riverside, Calif. Contact George Gerwing, Secretary, Riverside County Board of Trade, Riverside.

MAY 4-7—*Northwest Electric Light and Power*, regional meeting at Davenport Hotel, Spokane, Wash. Contact Carl A. Hoffman, Spokane. MA 5115.

MAY 6—*Forest Products Research Society*, Northern California section, spring meeting at Palace Hotel, San Francisco. Contact Harvey H. Smith, Box 245, Berkeley.

MAY 8-9—*Northwest Statistical Quality Control Conference*, sponsored by Seattle Section, ASQC., University of Washington and Seattle Chapter, American Statistical Society, at University of Washington, Seattle. Contact William A. Bennett, 16405 Marine View Drive, Seattle.

MAY 14-16—*Second Pacific Northwest Metals and Minerals Conference*, Benjamin Franklin Hotel, Seattle. Contact George Waterman, Manufacturers Minerals Co., 1107 W. Idaho, Seattle.

MAY 17-19—*Pacific Northwest Trade Association*, meeting at Hotel Winthrop, Tacoma, Wash.

CONTINUED ON PAGE 28

WESTERN INDUSTRY—April, 1953

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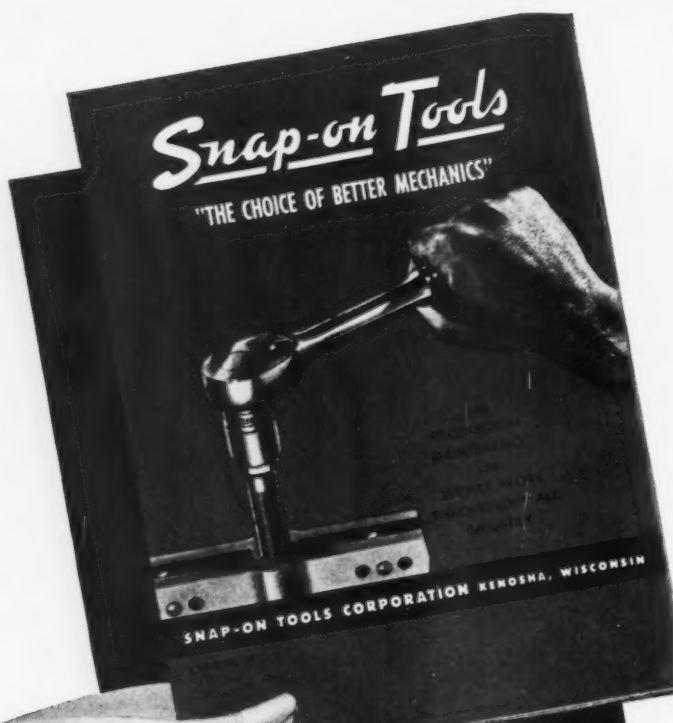
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CALENDAR OF MEETINGS

CONTINUED FROM PAGE 26

MAY 18-21—*California Assn. of Airport Executives*, Claremont Hotel, Berkeley. Contact Don Martin, Mgr., Oakland Airport.

MAY 23-24—*Executive Secretaries, Inc.* (national organization of key women in secretarial or administrative work). Hotel Claremont, Berkeley. Contact Anne Hawk, Ernst & Ernst, Central Bank Bldg., Oakland.

JUNE 13—*Western division of the Wire Association* at the Sir Francis Drake Hotel, San Francisco. Contact Richard E. Brown, executive secretary at 453 Main St., Stamford, Connecticut.

JUNE 28-JULY 1—*Rocky Mountain Coal Mining Institute*, Hotel Colorado, Glenwood Springs, Colo.

JUNE 28-JULY 2—*American Society of Mechanical Engineers'* semi-annual meeting at Hotel Statler, Los Angeles. Contact O. B. Schier, II, ASME Meeting manager, 29, W. 39th St., New York, 18.

AUG. 2-9—*Western Conference on Apprenticeship*, Balboa Park, San Diego. Contact Joseph H. Stephenson, Supervisor, Trade and Technical Trades, San Diego Vocational School, San Diego.

AUG. 17-22—*Institute of Radio Engineers Manufacturers Assn. and West Coast Electronics*, regional conference and exhibit in San Francisco. Contact Mr. Heckert Parker, exhibit manager, 1980 Jefferson St., San Francisco.

AUG. 19-21—*Western Electronic Show & Convention* at Civic Auditorium, San Francisco. Contact Frank Haylock, 58 W. Poplar St., San Mateo, Calif.

SEPT. 9-11—*Pacific Coast Gas Association*, at the Fairmont Hotel in San Francisco. Contact Cliff Johnstone, secretary, 447 Sutter St., San Francisco.

SEPT. 10-12—*Rocky Mountain Industrial Exposition*, Univ. of Denver Arena. Contact Harold S. Craig, exec. secretary Rocky Mt. Management Club, 1031-15th St., Denver.

SEPT. 13-16—*American Institute of Chemical Engineers*, national convention at the Fairmont and Mark Hopkins Hotels in San Francisco. Contact George Gester, P. O. Box 1627, Richmond, Calif.

OCT. 18-20—*Pacific Northwest Trade Assn.* Fall conference on water resource development, Hotel Davenport, Spokane. Contact D. C. Knapp, executive secretary, 1217 Joseph Vance Bldg., Seattle.

OCT. 20-22—*Pacific Coast Management Conference*, at the Claremont Hotel, Berkeley, Calif. For further information contact California Personnel Management Assn., 2180 Milvia St., Berkeley 4.

OCT. 22-23—*American Ceramic Society*, Western regional conference at Palace Hotel, San Francisco. Contact James Hicks, chairman, at Kaiser Aluminum & Chemical Co., Rt. 6, Box 290, San Jose, Calif.



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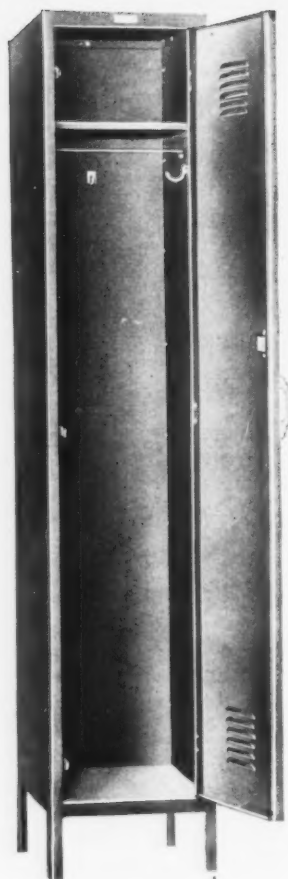


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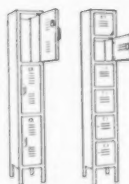
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THIS MONTH'S COVER

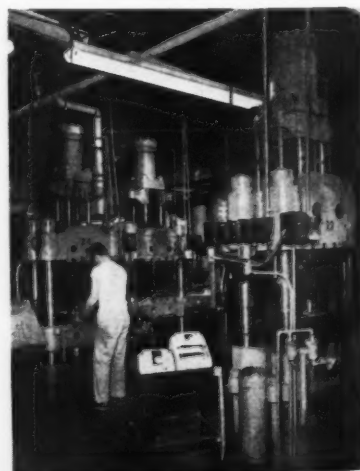
FROM TINY BEGINNINGS a Western business grew

STARTING with phenolic materials delivered in a suitcase by an enterprising salesman, this plastics company has grown until it now uses millions of pounds of material each year.

In 1950, the Sierra Electric and Manufacturing Co., Los Angeles, succeeded the McDonald Manufacturing Co., which was the oldest plastics company in the West, organized in 1921. The first plastic parts produced were electrical and photographic components. The company had been engaged in producing stampings, and entered the plastic molding business at the request of customers needing insulating parts.

From this tiny beginning, Sierra Electric has continued to grow, and is now producing plastic component parts for electrical appliances, electronics, radios, houseware and many other uses. Most of these parts are made to customer's specifications, and cover such specific items as radio cases, washing machine agitators, television parts, terminal blocks, handles, dials, office machine housings, aircraft parts and cable connectors.

A SECTION of the moulding plant showing a few of the more than fifty hydraulic presses, ranging in tonnage from 100 to 500 lbs. Another section operates injection moulding machines. Company has its own tool room which designs and manufactures all dies, tools, and fixtures.





Six bucks to repair a six-buck item?

Too much? Maybe so, but it's happening all the time. At today's maintenance rates of \$3 to \$4 an hour, regrinding a valve seat isn't a small job any more. Nor is repacking a valve, or installing a new one. Even replacing an ordinary pipe fitting isn't the same job it used to be.

You see, piping maintenance labor has gone up along with all other costs. That's why any excessive maintenance can quickly equal or exceed equipment cost.

You'll meet this problem best by insisting on the most dependable quality in piping materials. By having greater assurance they will stay on the job longer, need fewer repairs, cause less trouble. By standardizing on Crane Quality—the choice of thrifty buyers in every industry.

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Meeting Emergency Demands for Steel

Here are records of six emergencies faced—and met—
by Ryerson Steel Service:

Shutdown Averted

4:30 p.m.—1000 lbs. bar stock urgently needed to avert shutdown of night operations. Order processed by office at 4:35; goes to warehouse at 4:41. Steel leaves Ryerson plant at 5:30; arrives at customer's plant (7 miles away) at 6:05 p.m.

Shipped in 1½ hours

10:15 a.m.—two plates needed immediately. With customer still on phone, Service Department alerted. Steel sheared to size and on its way by 11:45 a.m. same morning.

Night Shift Comes Through

3:00 p.m.—order phoned in for 20,000 lbs. of sheet steel. Needed (90 miles away) at 8:00 a.m. next day. Working through the night, Ryerson warehouse crew cuts the steel—loads it on truck that leaves at 6:00 in the morning. Shipment arrives at customer's plant on time.

Breakdown Saturday—Production Monday

Saturday—11:45 a.m. Emergency call. 8" alloy steel round needed to repair breakdown of main shaft. Cut during lunch hour, the 1700-lb. bar is immediately trucked to airport; loaded on cargo plane. Customer meets plane on arrival in distant city. Repairs are completed Sunday; full production resumed on Monday.

Delivery 600 Miles Away—7 Hours

3:00 p.m.—200 lbs. of flat bars, in cut lengths, needed in a hurry 600 miles away. Just 2½ hours after receipt of order, plane takes off with steel from Ryerson. At 10:51 p.m. same day, customer has his steel.

Still Hot When Delivered

11:15 a.m.—Manufacturer reports breakdown; needs 2" x 72" x 10' plate at once—must be flame cut. Plate delivered at 2:15 p.m., still hot.

Of course, out of thousands of orders, we can fill only relatively few at such breakneck speed. However, in emergencies, the world's largest steel service organization, with 15 interconnected plants, is your best source for steel. And, despite some shortages, you can also count on Ryerson for most every day-to-day steel requirement. So when you need steel—carbon, alloy, stainless—call your nearby Ryerson plant.

PRINCIPAL PRODUCTS: CARBON, ALLOY & STAINLESS STEELS—BARS, STRUCTURALS, PLATES, SHEETS, TUBING, MACHINERY & TOOLS, ETC.

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LOS ANGELES PLANT: Box 3817, Los Angeles 54. Plant: 4310 E. Bandini Blvd. Phone: ANGelus 2-6141. From San Diego (No toll) Phone ZENith 6660.
SAN FRANCISCO PLANT: Box 188, Emeryville. Plant: 65th & Hollis Sts. Phones: OLYmpic 3-2933, ENTERprise 10176.
SEATTLE STEEL PLANT: Box 3268, Seattle 14, Wash. Plant: 1200 - 4th Ave., South. Phone: SENeca 2300.
SPOKANE (INLAND EMPIRE STEEL) PLANT: Box 2158, Spokane 10, Wash. Plant: North 207 Freya St., Spokane, Wash. Phone: KEYstone 9311.

APRIL 1953

ANOTHER LESSON IN PRODUCTION CONTROL

San Diego shipyard makes it effective, also visualizes practical sub-assembly design in its engineering

ANOTHER LOOK at production control and material control never does anybody any harm. It is entirely too easy to forget how widespread their applications may be.

In an age-old industry, National Steel and Shipbuilding Corporation, San Diego, is setting an example of management awareness of the fact that production control and material control, when based on adequate information, can be effective in the building of a variety of small and medium-sized vessels. It is also a good illustration of another matter too often overlooked, the importance of doing the engineering with an eye to practical sub-assembly design.

How it started . . .

When World War II caused the application of modern mass-production methods to shipbuilding, Pacific Coast shipyards, most of them totally new organizations, were outstanding in this respect. Full use was made of production scheduling, material control, jigg-ing of sub-assemblies and production line methods of manufacture.

Now the current revival of Government shipbuilding, creating intensified activity in yards from San Diego to Seattle, has resulted in a continuance and development of modern methods.

NASSCO, which entered the ship-building field in World War II, has been a leader in the development of

the modern steel tuna clipper. Now the organization is applying its skills to the production of a wide variety of vessels for the U. S. Navy and the Army Transportation Corps.

The list of vessels built, under construction or contracted for by NASCO includes thirty 45-foot harbor tugs, forty-eight 120-foot dry cargo

barges, six 64-foot "L" boats, twenty-four 65-foot cargo-passenger vessels, thirteen 100-foot tugs and five large minesweepers. The minesweepers are of wooden construction; all the others are steel.

National Steel and Shipbuilding Corp. continued to apply lessons learned during wartime to the con-

From Material Control
35 U.S. NAVY BARGES-NOBS-5610
MATERIAL STATUS REPORT-STEEL

ITEM NO.	QTY.	DESCRIPTION	1	2	3	4	5	6	7	8	9	10	11	12
1	10	10 x 1/2 x 20'-0" U.M.												
2	60	60 x 1/2 x 11'-6"												
3	35	35 x 1/2 x 30'-6"												
4	28	28 x 1/2 x 16'-0"												
5	92	92 x 3/4 x 25'-4"												
6	30	30 x 3/4 x 30'-0"												
7	140	140 x 1/2 x 25'-4"												
8	70	70 x 1/2 x 25'-4"												
9	140	140 x 1/2 x 25'-4"												
10	140	140 x 1/2 x 25'-4"												
11	140	140 x 1/2 x 25'-4"												
12	140	140 x 1/2 x 25'-4"												
13	140	140 x 1/2 x 25'-4"												
14	140	140 x 1/2 x 25'-4"												
15	230	91 x 3/4 x 22'-6"												

W O 9600

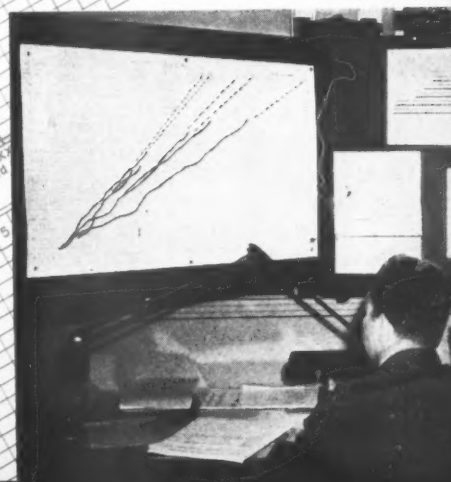
From Dept. 2
WEEKLY REPORT FOR 35 CARGO BARGES
SUB-ASSEMBLED UNITS

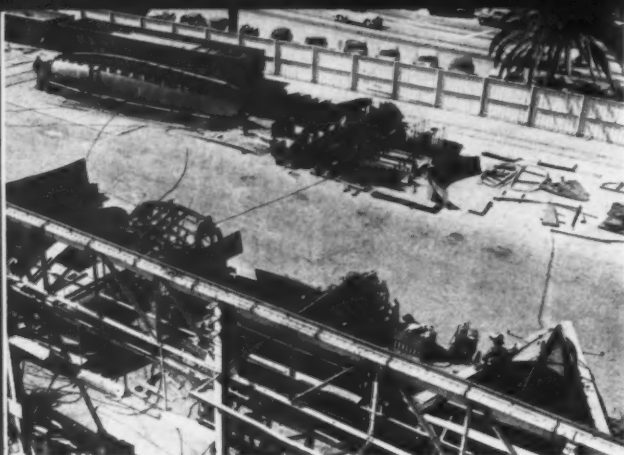
ASSEMBLY NO.	ONE BARGE REQUIREMENT	1	2	3	4	5
1	Bottom Panel / BP-3R					
2	do do / BP-3R					
3	do do / BP-3R					
4	do do / BP-3R					
5	do do / BP-3R					
6	do do / BP-3R					
7	do do / BP-3R					
8	do do / BP-3R					
9	do do / BP-3R					
10	do do / BP-3R					
11	do do / BP-3R					
12	do do / BP-3R					
13	do do / BP-3R					
14	do do / BP-3R					
15	do do / BP-3R					

W O 9600

(Erected X's)
(Fabricated)
Page 1
Date

Information is received weekly from the Structural Manager's office and transferred to the graph below. Top left is a Material Status Report which is submitted weekly, and lower left is a Weekly Report Blank which is filled out by Structural Steel Manager for management.

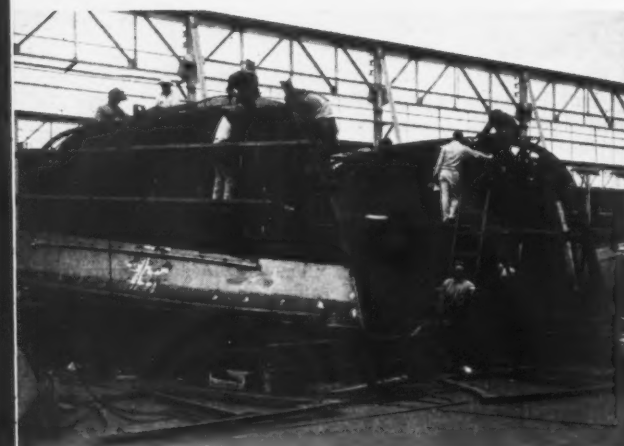




HERE, 65 ft. passenger and cargo vessel bow and stern sections are being assembled on jigs in fore-ground. Sub-assemblies then move to erection line and are assembled on keel which has been laid in a main jig.



STERN sections in sub-assembly, along with bow and bilge strake sections, are "tacked" on the jigs. Final welding is done when the sub-assemblies are fitted together on erection line.



ONE of the 24 bow sections for 65 ft. passenger and cargo vessel being "jigged" at Nassco.



LIKE the 65 footers, 45 ft. harbor tugs major installations are sub-assembled on jigs and then moved to erection line. Here, a bilge strake section is being formed.

struction of its fishing vessels. The stepped-up pace and larger volume of the current program has permitted it to go to greater lengths, however, in substituting machinery and fixtures for the handwork and art of the old-time craftsman. NASSCO's modern 32-acre plant provides the space, equipment and water front required to handle the construction of many vessels at one time. Its fishing vessel business has enabled it to maintain a large force which is accustomed to efficient working methods.

Obviously, proper development of the pre-fabrication technique requires much planning and scheduling to insure proper sequence of work and an orderly flow of material to the job.

Production commences

Production at NASSCO begins in Engineering. All materials required for each contract are taken off the plans and listed on a form which enables them to be identified with the plan and detail on which they appear. Normally, the scheduling of deliveries required is worked out between Engineering and the Production Control Department. On Government work, the ship scheduling activity of the Navy participates by preparing a master material erection schedule.

Material Control takes the list of requirements and specifications from Engineering and requisitions the material to be ordered by Purchasing. Delivery requirements and deliveries for major and critical items are set up on "Productrol" boards, by means of which a visual control of the whole material flow can be maintained.

However, a ship requires thousands of parts and keeping track of all of them is a major problem. To solve it, the material lists prepared by Engineering are made up into books, space is provided on each sheet for procurement and delivery information. As information becomes available, it is entered on a master copy which is duplicated for distribution to all concerned, and in this manner the control books are kept current.

Listing arrangement

The material sheets are so arranged that items required for a sub-assembly unit or a common system are listed together. It is easy, then, to determine whether any one group of items is available to allow work to proceed, or if expediting may be required in order to meet schedules. Also, difficulty in meeting specifications can be spotted and substitutes arranged if possible.

Likewise, Production Control employs visual assistance. The construction of each type of vessel is planned

out in a logical group of sub-assembly units and operating sequences. Time scheduling is set up on the basis of estimated man-hours to accomplish each step. The number of jigs required and the assignment of workers in order to accomplish the schedule can then be estimated.

As production begins, adjustments are necessary to keep the work flowing smoothly and to adjust for unexpected delays which are bound to occur. Daily and weekly reports compare the current situation with the planned schedule and afford a basis for determining any shifts in emphasis among the various items of work. Regular reports of man-hours consumption are compared with the estimates to keep guard against excess labor and to enable management to determine how each job is doing financially.

The most obvious parts of any ship are the hull and superstructure, although they do not necessarily represent the largest part of the cost. NASCO constructs its hulls in jigs, and sub-assembles entire superstructures for mounting on the hulls.

Step No. 1

First step in building a ship is the lofting. The cross-section lines of the vessel are drawn full size on a mold loft floor. From these lines, templates can be lifted for any part. Complete detailed plans are used in conjunction with the lines, so that all material sizes and details of construction are readily available to the shop, with a minimum of questions to be asked.

NASSCO endeavors to fabricate as much steel as possible in its structural steel fabricating shop. All material is laid out there to templates furnished by the mold loft and pieces are cut and formed.

For the smaller vessels complete frames, bulkheads, stem-keel-stern frame assemblies, etc., are welded together in the flat. Bulkheads have all penetrations made for piping, electrical work and machinery. As far as is practical, mounting brackets, etc., are welded on. All this requires planning but saves on assembly labor.

Important fixture

Complete shop fabrication also allows the use of a frame assembly jig. In this fixture, all the parts can be dropped quickly into place and positioned with a minimum of time-taking adjustment and fitting. They are then welded together to form the ship's skeleton. Keel and sheer strakes of plating, pre-cut and shaped in the structural shop, are lifted into place and welded. Once this is done, either

the jig is disassembled from the framework and re-erected for the next hull or the framework is lifted out of the jig, depending on how the jig is built.

The balance of the plating is pre-assembled on a special jig and set into place as a unit. This allows more work to be done simultaneously and also provides for working the assembly upside down in an easier position than directly on the ship. Deck plating on the small boats, however, is welded directly in place.

And then . . .

After the hull is plated, deck houses, bulwarks, masts, deck-fittings and other parts of fabricated steel are placed on board as completed sub-assemblies and welded down.

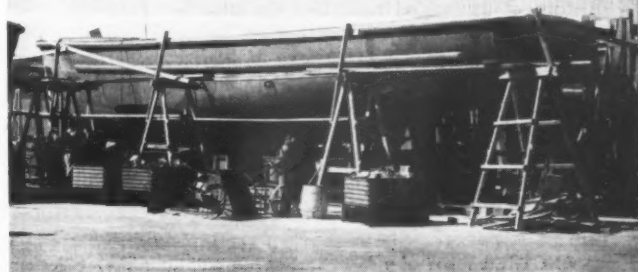
Small vessels are transported from the building site to the water front on



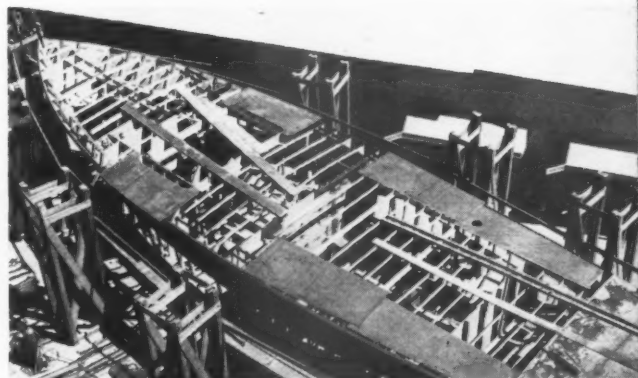
THIS VIEW of an erection line of 65 ft. P and C vessels is typical of Nassco's method of small craft construction.

NATIONAL STEEL AND SHIPBUILDING

STRUCTURAL SHOP



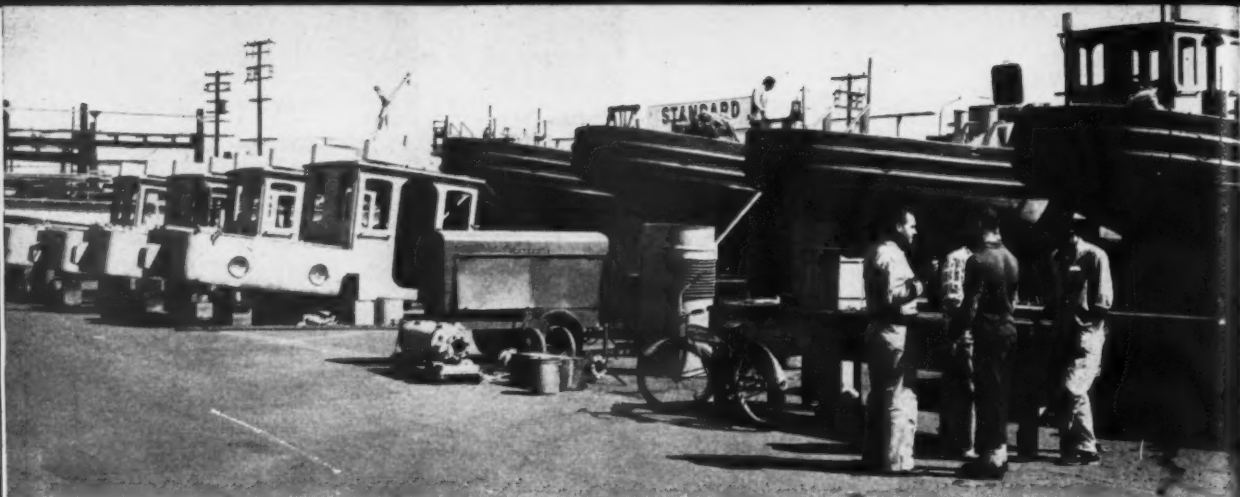
BOW SECTION in place and mid-ship bulk heads welded to keel, the next step in hull erection is that of fitting the bilge strake as shown here.



DECK and swell plating are fitted after the three major sub-assemblies are joined. Exterior jiggling is removed prior to this operation. Jig then goes to another erection site and is used with another vessel.



HERE is a 65 ft. P & C vessel in main erection jig with frames and bow section installed. Workers move from one vessel to another performing the same operation.



THESE ARE 45 ft. tugs in outfitting line where all interior fitting and equipment installation is done plus most painting. Deck houses and hulls are outfitted separately—then assembled before launching. Each deck house is "pre-fitted" to its hull on erection line.

a low-bed dray. They are launched either by lifting them over a bulkhead into the water or by running the dray into a marine railway cradle which can be run down an inclined track into the water.

Larger vessels involve weights which preclude handling by ordinary cranes and wheeled vehicles. They are therefore sub-assembled in sections, the sub-assemblies are fitted together on or adjacent to inshore extensions of the larger marine railways (NASSCO has 5 railways). Each sub-assembly is jig-assembled, using the same general methods used for constructing the smaller hulls. Plating is applied to the sub-assemblies in such a way that

plates will key together as units are assembled.

When the large vessels are ready for launching, a firm of house-movers comes into the yard and moves the ship onto the tracks leading to the marine railway. Special carriages run on these tracks which can handle ships up to 1,200 tons in weight.

Cost cutting

National Steel and Shipbuilding Corp. has learned that it is cheaper to do as much work as possible while a hull is on dry land and readily accessible to the shops, lifting equipment and utilities. Therefore, nearly all machinery, piping, electrical work, car-

penry, outfitting and painting is done before launching.

On multiple-ship programs NASCO schedules out all the work required to complete the vessel so that materials and equipment can be installed in an orderly and logical sequence. Workmen repeat like operations on one hull after another and gain the speed which results from their familiarity with the work.

Wherever possible, components are fabricated or sub-assembled in the shops and placed on board in sub-assembly form. This technique is especially useful for piping systems, where units can be made up for all the vessels in a program at one time.

ANOTHER VIEW of a 45 ft. harbor tug outfitting line at National Steel and Shipbuilding Corp. after installing deck houses.



Do you have these problems?

**POWER SWEEPING
TEMPERATURE CONTROL
GENTLE HANDLING
CORROSION RESISTANCE
PURIFICATION**

Do you have to handle . . .

**VISCOUS LIQUIDS
SLURRIES
SOLID PARTICLES**

HOW CULLIGAN ZEOLITE WON THE BATTLE

POWER SWEEPING, temperature control, gentle handling, corrosion resistance and purification were some of the problems encountered by Culligan Zeolite Co. in handling granular materials on a large scale at their San Bernardino, California, operation.

These were due to the necessity of handling viscous liquids, slurries and solid particles. Culligan Zeolite are the world's largest producers of gel-type zeolite, used primarily for water conditioning in the home.

The San Bernardino plant was built in 1942, principally for production of silica-gel for military purposes, although silica gel is tied in rather closely with zeolite production. After the war, the facilities were converted to zeolite production and a large expansion program was begun.

Materials flow

A step-by-step discussion of the materials flow will serve to illustrate many of the difficulties encountered in

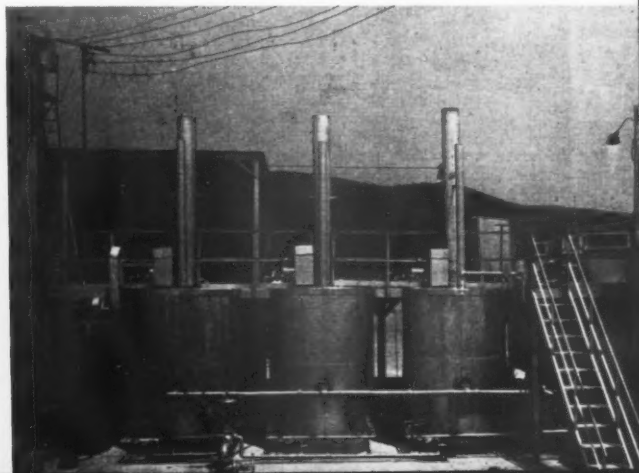
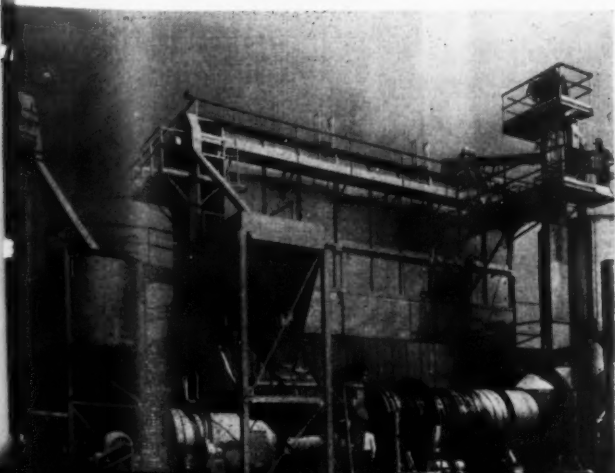
solving the materials handling problems involved.

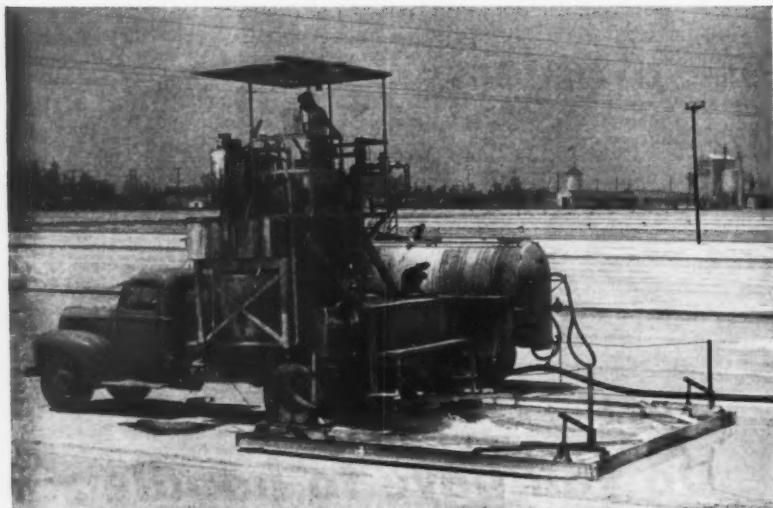
Unloading cumbersome at first

Aluminum hydrate was received in box cars in 100-lb. bags, but because of lack of equipment, it was at first necessary to hand-unload the cars onto a truck going to storage, unload the truck, and load into storage. This was a very slow, cumbersome, and costly operation. The bags are now loaded on pallets in the car, and hauled

1—AFTER thorough air-drying, silica gel is activated in this Rotolouvre dryer. Handles 36 tons of material per day at preliminary heat of 1,000 deg., expelling the product at 450 deg.

2—THREE gas-fired cookers where sodium aluminate is prepared from liquid sodium hydroxide and dry aluminum hydrate, then through centrifugal pumps to dispensing tanks.





3—POURING operation, showing the concentrated chemicals truck on the right, and pouring operation, with concentrated chemicals truck (right), measuring and mixing truck (left) from which the mixture, in liquid form, is discharged into the pouring box.



4—DRIED Zeolite, ready for harvesting following watering and evaporation.

with a Scoomobile to a suitable storage facility, thus handling the raw materials by systematized palletizing.

More problems

The second raw material, sodium hydroxide in the form of 50% caustic solution, was received in tank trucks, which proved to be inadequate in size. In this unloading with air, quite frequently the unloading driver or the attending operator was sprayed by caustic from loosened flexible pipe joints and connections, making this a dangerous operation.

Realizing this, a 10,000-gal. storage tank was installed, and caustic was received in tank cars.

Permanent pumps were installed to pump the caustic underground from

tank car to storage tank, a distance of approximately 400 ft.

In winter, the weather around San Bernardino is apt to be below freezing. Consequently, it was necessary to prevent the pipeline from going lower than 50 deg. F., the temperature at which the caustic starts to solidify. So a steam line was run adjacent to the pipeline and heating facilities were put into the storage tank so that the caustic could be kept above the solidifying temperature. There has been little pump trouble or material-carrying trouble since this system has been installed.

Third method

The third and final raw material is liquid sodium silicate which is delivered in tank trucks because of relatively short distance to the supplier's plant. This material is unloaded from tank trucks through a centrifugal pump to a large wooden storage tank, from where it is pumped into an overhead storage tank. This pump has a system of piping which prevents the possibility of overflow, except when the entire system becomes flooded.

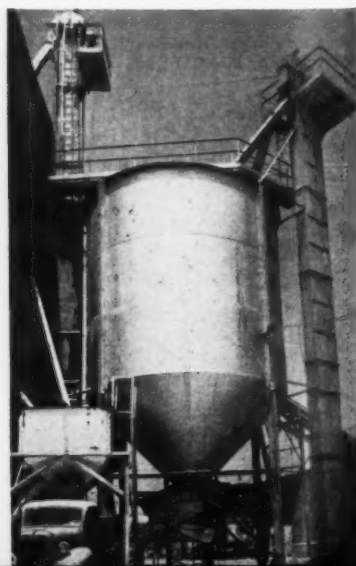
There is considerable difficulty attendant to handling sodium silicate through a pump since upon contact with air it solidifies or dries out quite rapidly. It is extremely difficult to prevent small leaks around the packing of the pump, and when this happens the pump packings are worn out very rapidly. In order to alleviate this condition it is necessary to play a water stream on the packing at all times, and keep the pump drained as well as possible. Any silicate which might seep through is immediately washed away from the packing.

The next operation is the cooking of sodium hydroxide and aluminum hy-

5—SWEEPING and loading the dried zeolite into dump truck for further processing. Scoomobile, converted from a skip-loader and power sweeping, performs the job.



6—SURGE bin with elevators for transporting the raw zeolite to mill building.



drate to form sodium aluminate. In order to do this, the bags of chemical were at the outset hand-toted to the overhead cooking platform and pumped into atmospheric cookers. A volumetric basis was used to determine the amount of material used. This method was found to be totally inadequate to get necessary quality control on the sodium aluminate. Accordingly, equipment was installed for weighing dry aluminate hydrate and liquid sodium hydroxide directly on platform scales, and from this point the two are introduced into an atmospheric cooker to be made into sodium aluminate. The liquid sodium aluminate is easily pumped through centrifugal pumps to dispensing tanks.

Divided tank truck transports

The next step in handling the liquid sodium aluminate and sodium silicate is to drop them into a compartmented tank truck which holds the two chemicals separate and transports them to the pouring operation. The only problem posed here was operation of the silicate pump run from a power-take-off on the transfer truck. It transfers the material to the pouring rig itself. Here again it was necessary to go to water-washed pump packing, accomplished by carrying a supply of water on the tank truck to take care of the operation.

Pouring rig

The pouring rig initially was designed so that the driver could operate from the road level with his two assistants handling the pouring box. However, with this method of operation, it was found that standards of production were not being met, due to measurement inaccuracies. The pouring rig was finally redesigned so the operator was placed on a platform on the top-

side of the rig, from which point he could operate all of his valves, levers, and controls, and see that solutions were being maintained at proper concentration. Two truckdrivers now handle the pouring box.

When the sodium aluminate and sodium silicate are finally mixed in proper proportions and concentrations on the pouring rig, mixture is discharged in liquid form into the pouring box. After setting into a firm gel, the zeolite is moved into the next position and is watered for a period that varies from two weeks to 45 days, depending on the time of the year and the atmospheric conditions. The watering serves to remove a large part of the undesirable soluble salts present, but does not interfere seriously with the drying.

During this solar evaporation period, the gel contracts and becomes quite hard. Hand-sweeping was at first used to pick up the dried zeolite and put it into dump trucks, but this required considerable labor. Experimental trials showed that a power-brush would satisfactorily handle zeolite without undue break-up and would overcome the disadvantages of hand-sweeping so power sweeping was installed to sweep the dried zeolite into windrows. A Scoopmobile, converted into a skip-loader, picks up zeolite directly from the field and loads it into a dump truck. This operation saves considerable labor, involving only three men for the harvesting of zeolite.

Past history

Originally, this dried material was loaded into a bin and fed, with the help of a man probing it, into a bottom-loading screw conveyor. Then it was elevated through a bucket elevator

\$50 plus an idea equals one acorn

DEHYDRATING zeolite by the solar process was first tried out by Emmett J. Culligan in Arizona.

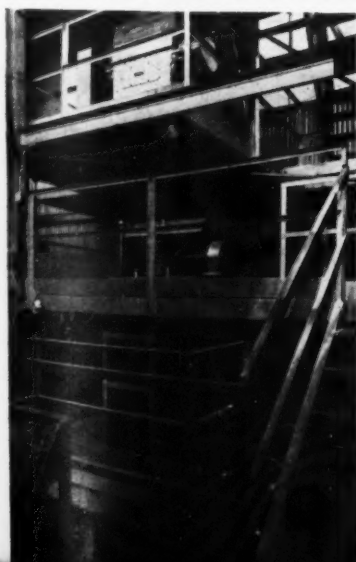
Then in 1936, with a total capital of \$50, he repeated the process in the Chicago suburb of Northbrook by the following astonishing method: he leased two miles of abandoned paved streets from the city council (Northbrook was in the midst of a real estate "bust"), filled the empty streets with silica gel and let the sun complete the job.

His next idea was to make water softeners available to households on a service basis through franchised dealers. After that came the San Bernardino plant, where solar dehydration on a large scale was feasible, with a hot dry climate to help out.

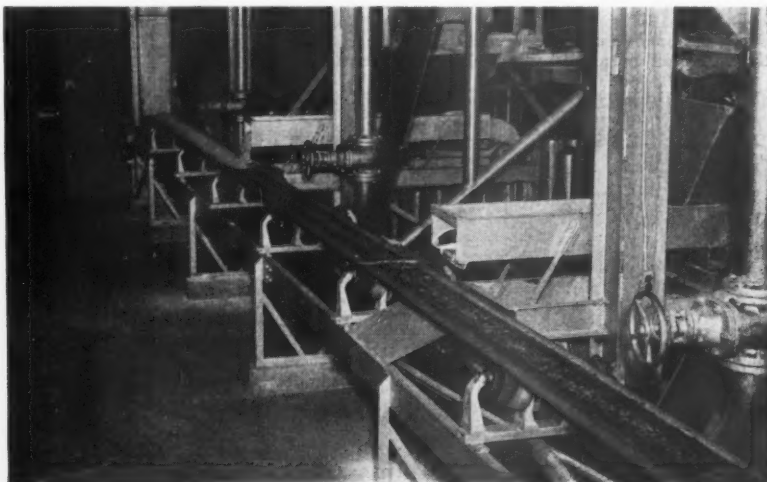
onto an inadequate classifying platform. From there it was introduced into up-flow washing tanks that were also improperly designed in that the material was not allowed to wash gently. There was a jet action and the zeolite was being used as a sandblast, which in addition to eating out the tanks in a relatively short time, also allowed so much attrition of each particle that "fines" production was increased considerably.

The screw conveyor was also a definite contribution to our fines problem. Since redesigning, a dump truck comes

7—MILLING, upper section, rotex screen in center, wash tanks in lower section.

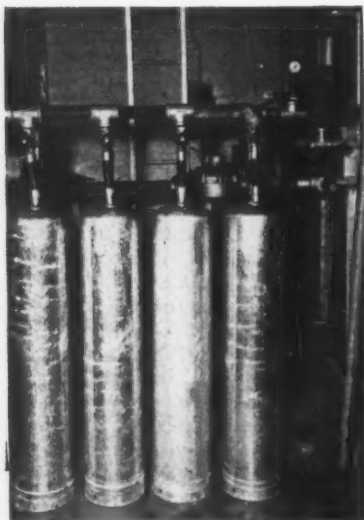


8—CONVEYOR BELT transporting finished zeolite to be bagged. Conveyor reversible in direction: as needed it can run either directly to the hopper, otherwise to the dryer.





9—BAGGING wet finished zeolite with an Exact Weight bagger before shipping.



10—BANK of four service units piped in parallel supplying an industrial plant.

11—CULLIGAN soft water service trucks such as this service over 3,000 communities in practically every state. They deliver the water softener and replace the empty containers.



over a hopper through which the material discharges onto a drag conveyor being brought to the top of either an overhead storage silo or into a quonset hut for storage. From the overhead silo, it is discharged onto a vibrating feeder which again stresses gentle handling and feeds it into another bucket elevator, lifting it to the top of the mill building.

In the mill building final processing takes place. The material as received from the field is first graded over a rotex-type vibrating screen. This screen incorporates the use of rubber balls between the sizing screen and a retaining screen to keep the screens from being fouled. The over-size material goes into a roller-type mill to be broken down into smaller particles which are graded over another rotex screen. Zeolite from all the screens is then accumulated in a common discharge chute and brought over a Wilfley classifying table for the removal of extraneous sand and gravel that has blown in.

Water conveyor

From the classifying table, it is conveyed by water into the up-flow washers, presently designed so that a gentle up-flow action will take place, washing out a very high percentage of remaining soluble salts. The mineral is pumped as a slurry from the bottom of the wash tanks, which are hopper-bottomed in shape. Considerable trouble in the past was caused by the pump's tendency to break the material down into a finer particle. A Fairbanks-Morse trash pump which gives the material as gentle a handling as possible is now giving satisfactory results.

The slurry of granular zeolite is pumped to overhead storage tanks where excess water is allowed to drain off. From these tanks, the moist zeo-

lite discharges onto a reversible conveyor belt.

Wet zeolite has a very bad tendency to bridge, and the tanks became quite full without discharging any into the vibrating feeder. In order to overcome this difficulty, it was necessary to install a vibrator which aided the flow considerably and evened out the discharge onto the vibrating feeder. From the vibrating feeder, the zeolite is dumped onto a conveyor belt, and is fed into a small overhead hopper.

This conveyor is reversible in direction, and depending upon the type of material wanted as a final product, i.e., wet or dry, it can either run directly to the hopper or else to the dryer. From the hopper, it is bagged, weighed, and then dropped to floor level where it can be put onto a handcart and loaded into a box car.

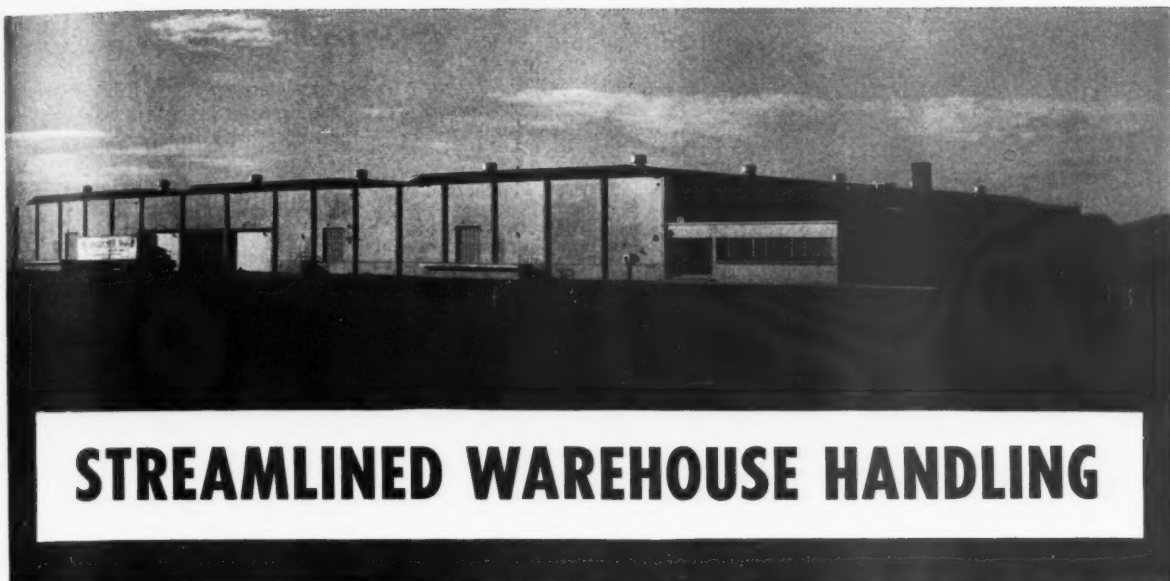
Distribution

The Culligan Zeolite Company distributes the manufactured zeolite through its Culligan soft water service operators. The bulk of the material goes into a service-type galvanized steel tank, 9 in. in diameter by 42 in. high, used principally for softening water in the home.

The tanks as received from Culligan Zeolite Company are backwashed and regenerated with a brine solution. They are then distributed to customers in their franchised area on a service basis. The customer has no equipment to buy and no work to do. A monthly charge is made for this soft water service similar to a gas, electric, telephone or other utility. The tank remains in the home until its capacity has been expended, after which it is removed and a newly regenerated tank put in its place. The expended tank is brought back to the plant where it is completely regenerated, sterilized, and ready for a trip to another location.

12—AN OVERALL view of Culligan Zeolite plant, biggest in U. S. These drying beds and plant, located at San Bernardino, Calif., represent half of the U. S. synthetic zeolite capacity.





STREAMLINED WAREHOUSE HANDLING

THIS expandable 108,000 sq. ft. warehouse for Hanford Works will consolidate material now stored in 30 scattered warehouses. At far right may be seen a portion of the "Soulé" all-metal covered storage building to be used for lumber and building materials.

New Central Stores building at Hanford plutonium works solves problems of consolidation and disbursement

18th article in *Western Industry's* plant construction series

A RECEIVING, storage, and disbursement warehouse has been constructed at Hanford Works, Richland, Washington, to take care of the more than 45,000 "line" items required to keep plutonium production rolling.

The \$1,100,000 "central stores" building consolidates and brings up to date 30 scattered warehouses developed during World War II. The new 108,000-sq. ft. warehouse is operated by the General Electric Company, as prime contractor for the U. S. Atomic Energy Commission.

Building

Though not revolutionary in design, the building is the first tilt-wall type construction at the plant, being constructed of reinforced concrete with a wooden roof. Concrete floors were poured on a compacted fill and forms were laid on these floors with a non-adhering substance applied within the

forms. The 16-ft. walls were poured on the floors and then tilted into place. Walls were tied together with reinforcing steel and concrete pilasters were poured.

An under-the-floor system of electrical and telephone conduits adds convenience in placing desks and office machinery. Outlets are located under the asphalt tile floor with a magnet and tapped for use after office equipment is moved in.

Solid support

The warehouse is divided into three 33,500-sq. ft. bays. Each bay is separated by a six-inch thick concrete wall, and double, heavy-duty fire doors. The doors close automatically when temperature reaches a danger point, and may also be operated manually.

A temperature-controlled alarm and sprinkler system throughout the building gives protection against dreaded

warehouse fires, and is connected directly with the Richland Fire Department. Other fire protection includes fire-resistant paint on the ceiling in the inflammable storage room, and fiber glass acoustical board on the ceiling in the office and file room.

To each its own

An area is designated for office space, a "Kardex" file room, rest rooms, and a room housing the heating system.

The warehouse is expandable, being designed so that more bays can be added with little alteration to the present building. A contract for a fourth bay has already been let.

An oil furnace with a butane igniter to preheat the very thick fuel oil, heats the building.

Color and light play a large part in design and equipment, and are expected to increase efficiency and add to employee morale. Modern fluorescent



BY USING specialized metal shelving for compact storage of small parts, two rows save four rows of regular shelving. In this windowless warehouse, shelving in the bays is painted light green for 50 per cent reflection of light, for efficiency and to help employee morale.



ABOVE—Stoop, squat and squint are taken out of material checking by these light metal write-up desks because of their mobility and stand-up height. Such equipment was impractical before scattered warehouses were consolidated into "Central Stores."

BELOW—Master control inter-communications system, operated by a general information clerk, makes all corners of the building accessible with the flip of a switch. Clerk can call any one station for information, or all the stations simultaneously.



lighting is high and even, giving uniform light to the entire building.

Bays

Equipment layout in each of the three 33,500-sq. ft. bays varies according to its intended use.

Two-fifths of the first bay is set aside for inflammable storage, separated from the rest of the bay by a concrete wall and fire doors. Sprinkler heads are placed close together, and the ceiling is painted with fire-resistant paint. Here will be stored such things as paint, chemicals, janitors and laundry supplies. In one corner of this section is a room in which controlled temperature protects photographic, blueprint and other supplies from costly damage which may result from rapid changes in temperature.

In the remainder of the bay are 54 rows of metal shelving seven shelves high and 18 in. deep. Circular shelving for small items may be rotated for easy access to material.

Bay number two has been designed for a combined receiving station and bulk storage. Three electrically-operated doors may be rolled up to allow six large freight trailers and tractors to back up and unload all at one time. Outside each of the bays are loading docks for disbursing material headed for all corners of Hanford Works. A railroad spur extends along the building's west side for receiving carload rail shipments.

Dock levelers may be adjusted to meet varying levels of truck beds backed in for unloading so that electric tractors and forklift trucks can drive

Manufacturers of equipment for warehouse at Hanford:

Contractor — Sound Construction and Engineering Co., Seattle

Electrical Installation — Tice Electric, Portland

Wooden overhead doors — Overhead Door Corp.

Fire and Receiving Bay Doors — Fryer-Knowles, Seattle

Sprinkler System — Automatic Sprinkler Co., Seattle

Furnace — Gabriel Boiler Co.

Mechanical Work — J. P. Head Co., Pasco

Shelving and Pallet racks — R. S. Peters Co., Portland

Automatic materials handling equipment — Air-Mack Equipment Co., Seattle

right onto the beds. Doors are 25 ft. wide and may be rolled open for a 14-ft. clearance.

In the third bay will be found more storage and disbursement area with room for charging batteries of electric forklift trucks and small tractors, along with more metal shelving.

Separated from the concrete warehouse is a 36,000-sq. ft. covered storage warehouse for building material needing protection from the elements. This is a Soulé all-metal prefabricated building with a small office space at the north end. Another 1,500-sq. ft. building is set aside from the others, providing isolated storage for compressed gases.

Offices

In the main office, windows along the north wall give daylight without glare, and installations provide good lighting under all conditions. The large office is soft-grey on the inside walls and light green on the outside wall. Private offices on the east side of the building combine salmon, yellow, and grey-green. Acoustical board on the ceiling absorbs sound from clatter of office machinery and general distracting noises of a large, busy office.

Office space is constructed with prefabricated Hauserman partitions. In the receiving bay office, electric heat will protect occupants from drafts and temperature changes when receiving and disbursement doors are opened.

A general information clerk, operating a master control intercommunications system, will be able to put her finger on the right item with the flip of a switch. She will be able to reach any corner of the warehouse or covered storage building without even leaving her desk. A single station can be called for information, or all stations can be called simultaneously.

A small office built of prefabricated, packaged Hauserman partitions, with a roof, serves the receiving section of the warehouse.

Shelving

Specialized rotating shelving for compact storage of small parts is a space saver in the new warehouse. Two rows of such shelving save four rows of regular shelving. All shelving used in windowless warehouse bays is painted light green for 50% light reflection. Efficiency of operation as well as good employee morale is expected to result. The specialized shelving handles glass tubes, welding rods and other types of easily-damaged goods.

Trucking

Loading docks of proper height, and one-level flooring, have made possible

AN INSIDE receiving ramp will hold six semis and tractors for unloading into the receiving bay. Electrically operated roll-away doors are 25 ft. wide, 14 ft. vertical clearance.



TRUCK BEDS meet the level of the inside receiving dock when levelers shown here are put into use. Forklifts and tractors may cross leveler from dock into the trailer.



CONSOLIDATING some 30 scattered warehouses at Hanford Works under one roof made it possible to use electric forklifts and tractors. Painted white for safety and visibility.



the installation of six electric forklift trucks. Depending on their size, they can lift 1,000 to 6,000 lbs. of material nine feet in the air, doing, in minutes, work which has previously taken hours of hard manual labor. All trucks and tractors are painted white for easy visibility and safety.

Desks

One-level flooring has also made it possible to install portable write-up desks which may be rolled to any part of the warehouse with ease. These are designed and fabricated especially for Hanford Works out of light-weight

metal, and will be used for checking material.

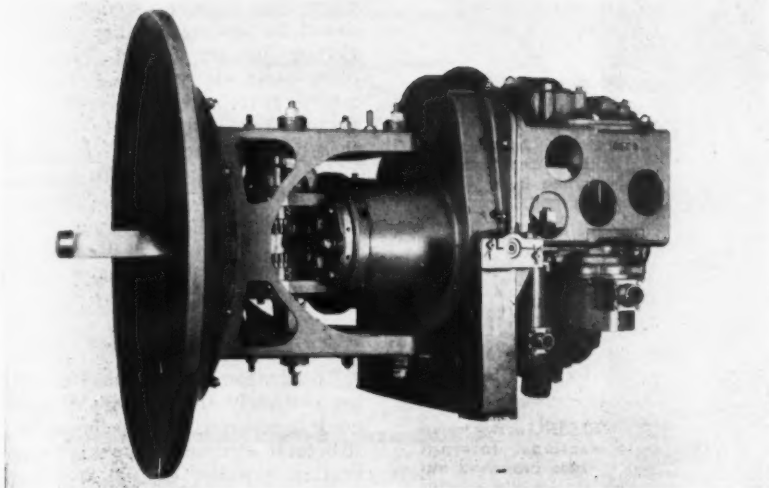
Previously it had been necessary for checkers to do their work with a clipboard propped on a knee. Mounted on wheels, desks are stand-up height and may be moved to any spot in the warehouse. They are painted light green to match the shelving. Their mobility and stand-up height take the stoop, squat, and squint out of materials checking.

The consolidation of warehouses into the new "central stores" warehouses is expected to initiate a sharp curve in the speed and quality of service offered.

MAGNESIUM WELDING

*New adaptations meet structural and electrical
soundness requirements in airborne radar antennas . . .*





COMPLETE radar antenna—one of many types produced by Dalmo Victor. By weight, 50 per cent of an antenna may be magnesium castings, weldments and wave guide.

THE ADAPTABILITY of magnesium for high speed antennas on airborne radar equipment has made Dalmo Victor Co. one of the West's principal users of magnesium welding.

Dalmo Victor, an electronics manufacturer located in San Carlos, California, is a leading designer and producer of radar antennas for the nation's military aircraft. Magnesium is employed wherever possible in castings, structural weldments, formed sheet metal and extruded wave guide forms.

This light-weight metal is ideally suited to the airborne antennas, complicated electro-mechanical devices in which high speed motions and flight requirements make lightness essential. One of the antennas is illustrated.

Supported and operated by the antenna is a parabolic disk or reflector, which beams the radar signals to distant targets and also collects the returning signal that reveals the presence and location of the target object.

The reflector unit is driven by an electric and/or hydraulic system, so that it describes a scanning pattern which causes the microwave beam to search a large volume of space surrounding the aircraft. Difficult mechanical problems are involved in moving this device, often at high speeds. In addition, the assemblies, being subject to rigid military flight requirements, must be designed and built to extremely high quality standards of resistance to shock, vibration, acceleration, corrosion, etc.

(Left) REQUIREMENTS of magnesium wave guide include complicated forms to fit into mechanical configurations of antenna. Here one type is shown in Heli-arc welding process.

Dalmo Victor had its first introduction to magnesium fabrication in 1942 with contracts for production of incendiary bombs and hand grenades. Observing the light-weight, structural possibilities of magnesium for antenna applications, the company launched a research and development program in 1946 to determine the limitations in the use of this material.

Repairing was first use

The first use of magnesium welding was in the repair of damaged or faulty castings; then later for the assembly of rotary and stationary flanges to the ends of extruded wave guide sections. The wave guides—hollow, metallic tubing for conducting microwaves—are scaled dimensionally in terms of wavelength for the frequencies being transmitted.

Today finished wave guide production at Dalmo Victor frequently exceeds 2,000 feet per month, using extruded tubing plus additional quantities of sand cast and lost-wax cast wave guide.

Because radar antennas are designed for performance under extreme flight conditions, quality requirements are particularly exacting for welding as for all phases of the intricate manufacturing process. Ordinary shop welding methods will not suffice where transmission of microwaves is concerned.

All of the magnesium welding operations at Dalmo Victor utilize the Heli-arc process and a dozen highly trained production welders are kept busy continuously. Requirements of the work are so exacting, however, that operator training poses a real problem. According to William Graves, welding engineer, a four-month training period is



SOME OF the welded magnesium parts and components which are used for the Dalmo Victor radar antennas.

required to qualify an experienced welder for the operations required by the electronics firm. Many of the candidates in this constant training program are never able to develop the complex combination of skills necessary for the work.

All the wave guide welding opera-

MAGNESIUM CHARACTERISTICS

from the Magazine of Magnesium

PURE MAGNESIUM melts at 1204 deg. F. and boils at 2007 deg. F. Magnesium alloys have somewhat lower melting and boiling points. The degree of contraction from a liquid to a solid at its melting point is about 4.3%; from a liquid at melting point to a solid at 70 deg. about 9.7%.

In the temperature range from 65 deg. to 750 deg. the average coefficient of expansion is 0.000016 in. per inch per degree F. On the basis of equal volume, the total heat for fusion of magnesium is approximately two-thirds that for aluminum and one-fifth that for steel.

Because of its high coefficient of thermal expansion and high thermal conductivity, distortion produced when welding magnesium is much greater than when welding steel; it behaves very much like aluminum.

Magnesium oxidizes rapidly when heated in air and the oxide re-crystallizes at high temperatures and becomes so flaky that the film breaks up more readily during welding than does aluminum oxide.

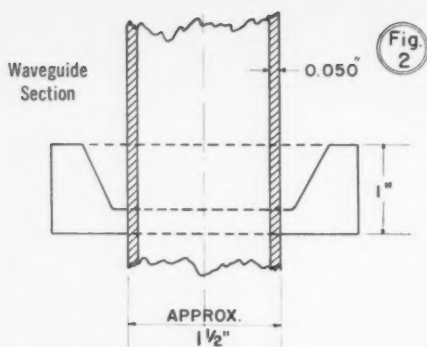


Fig. 2
CROSS SECTION of magnesium wave guide, showing way in which flanges are attached by welding. Joining thick and thin sections requires high degree of welding skill.

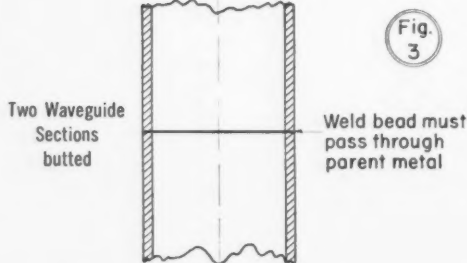


Fig. 3
BUTT WELDING of two wave guide sections. Internal bead is later broached out to form electrically continuous inner surface.

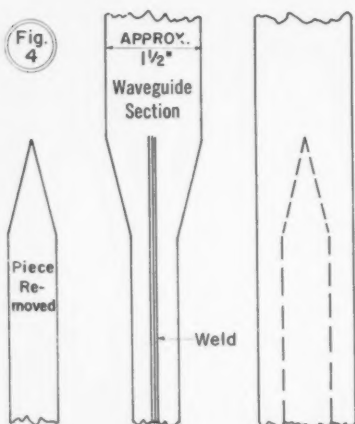


Fig. 4
REDUCTION in the wave guide section is accomplished by punching out two tapered pieces as shown at left, drawing wave guide walls together and making longitudinal weld.

tions involve the double requirement of structural and electrical soundness, under operating conditions which involve the transmission of large amounts of radio frequency power through the wave-guide tubes. For this reason, all such welded items are subjected to 100 per cent X-ray inspection under Navy specification conditions.

Also, since the wave guide in use is (for electrical reasons) operated under an internal air pressure, all finished parts must also be subjected to a pressure test. This, in the majority of cases, requires a total absence of leakage under a gauge pressure of 30 pounds per square inch.

Typically, one of these welds in-

volves the joining of a thin (0.050-in. section) wave guide wall to a relatively heavy flange as shown in Figure 2. This joint must be made without distorting the internal dimensions of the wave guide which are quite critical.

In another case, two wave guide sections are joined end to end as shown in Figure 3, or a piece of wave guide is necked down from its full dimension as shown in Figure 4 by the removal of a v-shaped section and drawing together of the outer walls into the new form.

In these cases, no unjoined section of magnesium can be left on the inner wave guide wall, since it would produce an electrical discontinuity with resulting loss of radio frequency power and localized arcing.

Thus the welding bead must be forced completely through the wall and the inside bead removed by broaching or profiling. A typical example of one of these complex wave guide shapes being welded is shown on the first page of this article.

Materials involved

Magnesium alloy FS-1 is the material of the parent metal in these operations while type C alloy welding rod is used throughout. In this combination the parent metal has a melting point of 1,160 deg. F., while the rod melts at 1,140 deg. F., giving a 20-deg. differential. This close difference in melting points necessitates unusually skillful welding manipulation to insure sound weld metal deposition without harm to the parent metal.

To insure the required precision of

alignment between sections being joined by welding, holding and positioning jigs are devised. These are often quite elaborate and must be tailored to the requirements of the particular pieces under process. Many of these jigs are made from magnesium, because of (1) its flexibility as a construction material, (2) its ready availability in the company's operation, (3) its relatively high scrap value, and (4) the advantageous matching of expansion characteristics.

Main problem

To solve the major problem of welding extremely thin sections of wave guide to relatively massive flanges and structural elements, differential pre-heating is widely utilized at Dalmo Victor. In this technique both of the separate parts are pre-heated but each is carefully brought to a different temperature before the joining weld is made.

Due to magnesium's high coefficient of expansion and low modulus of elasticity, warpage is an ever-present problem and is overcome by the combination of careful sequencing of welding, stress relieving, machining and assembling operations.

Stress relieving serves the dual purpose of establishing required dimensional tolerances, as well as reducing the effects of stress corrosion for enhancing the life of the finished parts under what are already difficult corrosion conditions. Magnesium is particularly subject to atmospheric corrosion under the salt-spray operation conditions to which this equipment is frequently subject.

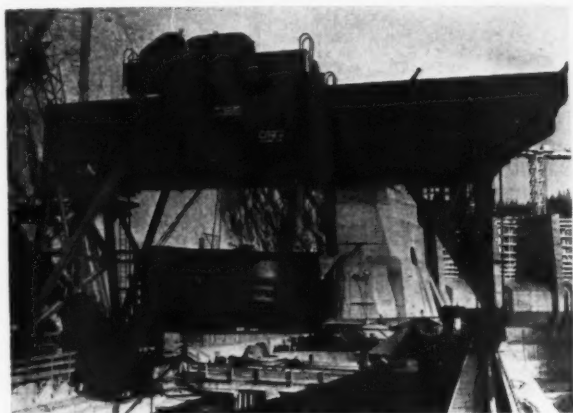
Structural parts of these radar antennas are customarily castings, but weldments are frequently used in prototype models where speed of completion or the likelihood of design changes would make patterns obsolete. Sometimes structural weldments are also used in final production models where weight, dimensional and/or structural strength requirements make it difficult to use castings.

Under the rigorous requirements applied to all parts manufactured at Dalmo Victor, Heli-arc welding requires the use of helium gas as an oxidation shield, resulting in a relatively high-cost operation. Therefore, large complex pieces are usually more economically produced as castings.

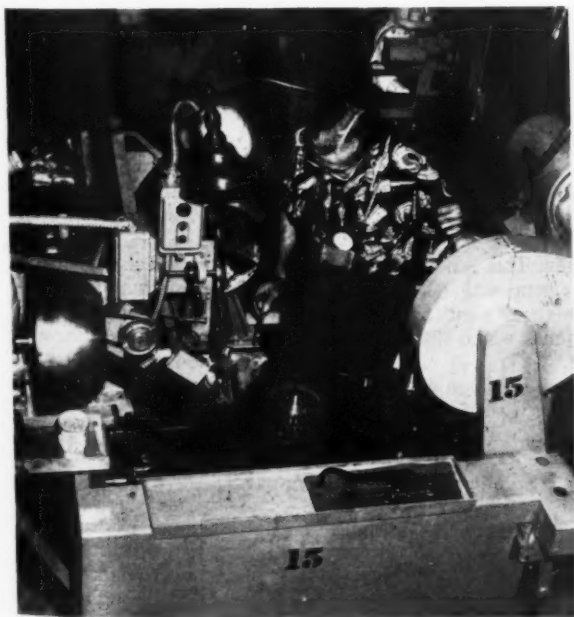
Welded magnesium is rapidly becoming a widely popular type of construction throughout industry where, in most cases, regular steel welding operations are concerted to the light metal. Many of these operations can use the lower-cost argon gas and operating costs can be kept low.

WESTERN PROCESSES AND PRODUCTS

in
Today's **V**iew



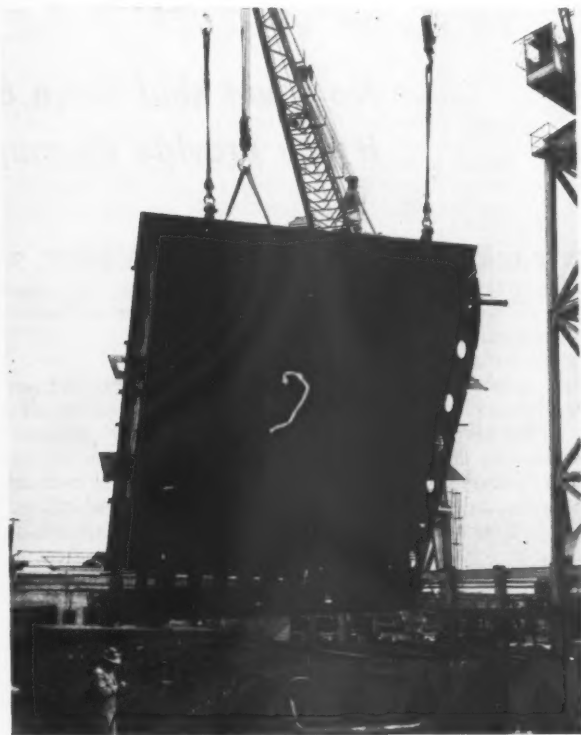
TOUGHEST of the tough is the rating given the access and construction job for The Washington Water Power Company's Cabinet Gorge hydro plant in Idaho. Here is a 275-ton gantry crane for service over the turbine area in whatever weather.



CHERRY RIVET engineers at Santa Ana, Calif. design this special purpose machine which automatically inserts stem in rivet and upsets head on stem. Stems and rivets are fed into separate hoppers, assembled, then move to right and headed.

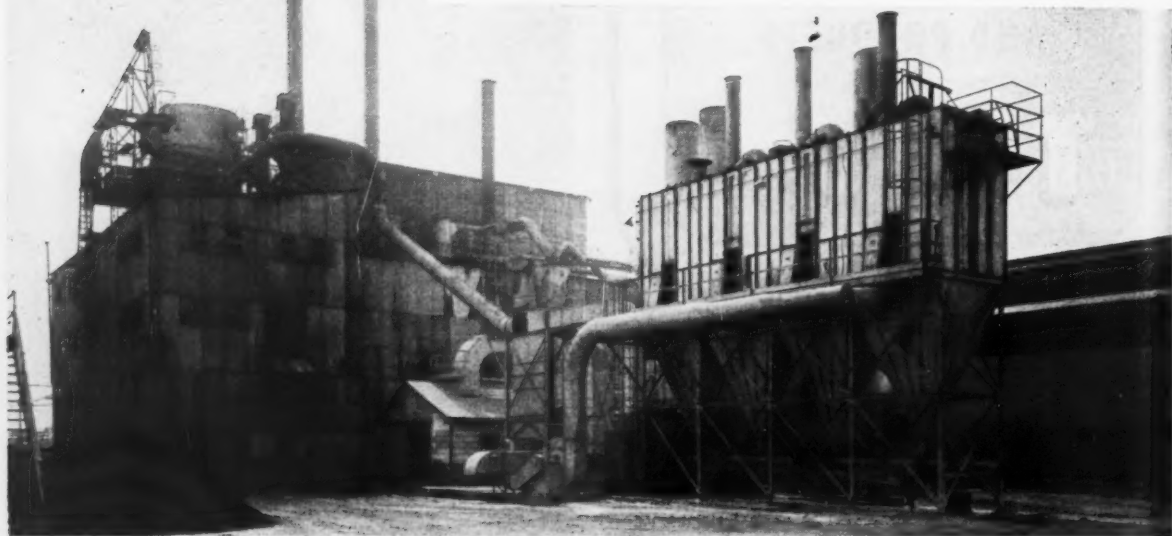


PORCELAIN ENAMEL is a tricky product requiring close inspection for light reflection characteristics, thickness and acid resistance. Here are lighting reflectors being checked before packing at Smoot-Holman Company plant in Inglewood, Calif.



BOTTOM ASSEMBLY unit for first of five Mariner-type cargo ships pre-fabricated at Bethlehem Pacific's San Francisco shipyard. Unit is sub-assembled upside down with all floors and girders complete, turned over after installation of the coils.

HERE, a continuous automatic cloth-tube collector is filtering gases from two coal-fired cupolas melting Murray Smelter slag in the manufacture of rock wool products at the Johns-Manville Products Corporation, Watson, California.



BE SURE YOUR DUST COLLECTOR COLLECTS THE DUST

*No plant shut-down due to failure of system
if you provide thorough periodic inspection*

VARIOUS factors, such as industrial hygiene, nuisance, or product recovery, are responsible for the increased emphasis which has been given during the past several years to the collection of dusts produced by industrial plant operations.

It has been realized that some dusts cause lung diseases, others cause systemic poisoning, and still others cause allergies and skin diseases. Some dusts are inflammable and/or explosive. Some materials are so valuable that an efficient plant can't afford to lose them in the form of dispersed dust.

For these reasons, as well as for the abatement of bothersome dusts in residential neighborhoods, industrial plants have employed various measures of control.

Tried and true method

One of the oldest and most widely used methods of dust control is by

By W. S. SCHAMEL

District Manager
American Wheelabrator & Equipment Corp.
Los Angeles

local exhaust ventilation. This is done by creating air movement into efficiently designed hoods sufficient to overcome the air currents which disperse the contaminant.

A local exhaust system is composed of hoods, some type of duct work, and in most cases, some type of dust collector. Except in cases where the moisture content of the air is high enough to cause condensation or where the temperature of the air is above the range for filter fabrics, cloth filtration finds wide acceptance in dust collection equipment, because of its high efficiency, 99% plus.

Filtration is the most efficient means known for separation of fine particles in gases. The efficiency of a filter is

independent of gas temperature, the concentration of contaminants, and to a lesser degree, the filter velocity and the particle size of the contaminating material.

Other types of collectors, such as wet scrubbers, electrostatic precipitators, and centrifugal collectors are sensitive to one or more of the variables mentioned above.

Kinds of cloth filters

Two general types of cloth filters are being manufactured, the cloth tube or bag type and the cloth-screen type.

In general, with the cloth-tube-type, the air enters the lower part of the collector and passes upward through the cloth. A well-designed collector will have the air entering through an expansion chamber, so that the velocity of the air decreases and lets the heavy particles drop out of the air stream

Continued on page 50 . . .



Revere Aluminum mill in Los Angeles ...READY TO SERVE WESTERN INDUSTRY

Shortly after you read this, the first Revere seamless drawn Aluminum Tube produced west of the Rockies will be shipped to Western manufacturers. For the production of this and certain other aluminum products, Revere has nearly doubled the facilities of its Pacific Coast Division, has installed machines of the latest design, and has staffed the mill with personnel trained in the techniques Revere has developed for working with aluminum.

The first tube to be produced here is in the widely used 3S Alloy. Other tube alloys now going into production are 52S, 61S, and 63S. By early summer, this mill will also be making extruded shapes in Alloys 61S and 63S. Modern heat treating facilities enable Revere to supply these products in a full range of properties to specification.

With these new facilities, Revere can supply the

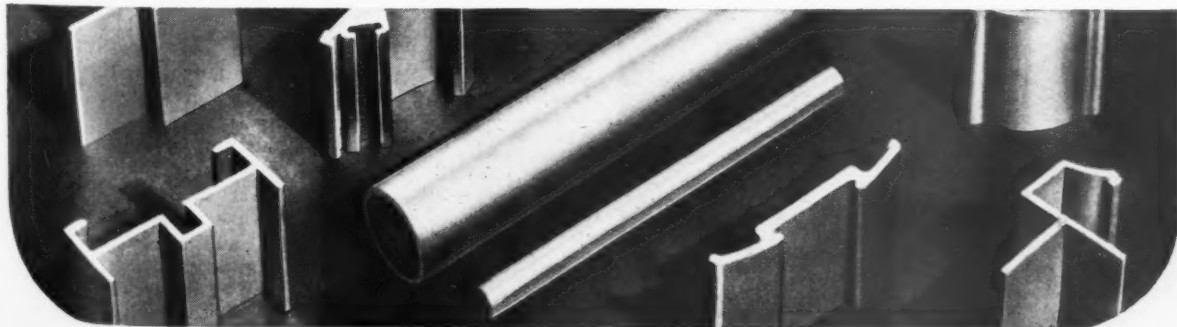
progressive, fast-growing industries of the West and Southwest at a saving in delivery time and shipping costs. The Revere Technical Advisory Service is available to help you in the efficient use of Revere products. For fine metals and experienced service, get in touch with the nearest Revere office today.

REVERE ALUMINUM **REVERE COPPER AND BRASS INCORPORATED**

Founded by Paul Revere in 1801
230 Park Avenue, New York 17, N.Y.

*Mills: Baltimore, Md.; Chicago and Clinton, Ill.; Detroit, Mich.;
Los Angeles and Riverside, Calif.; New Bedford, Mass.; Rome, N. Y.—
Sales Offices in Principal Cities.*

LOS ANGELES: 6500 East Slauson Ave. Underhill 0-3331
SAN FRANCISCO: 116 New Montgomery St. Sutter 1-0282
SEATTLE: 1331 Third Ave. Main 1401



BE SURE DUST COLLECTOR COLLECTS THE DUST . . .

. . . Continued from page 48

before they reach the tubes. This virtually eliminates abrasion of the cloth.

The filter cloth is in the form of long tubes or bags, open at the bottom and closed at the top. They are suspended inside the collector compartment and tightly sealed into a plate at the bottom. This plate and the cloth, itself, separate the clean air side from the dusty air side.

Tube-type collectors can be subdivided into categories according to the manner of cleaning the filters. In one type, the dust cake which forms on the tubes is removed by mechanical shaking of the tubes. In another type, cleaning is accomplished by reverse air flow.

In the cloth-screen type, the air may enter either at the top or bottom of the collector, and the filter fabric is applied over a series of rectangular frames, covering both sides and three edges of every frame, with the fourth edge left open to form a flue for the outgoing clean air. Cleaning of this type is accomplished by mechanical or vibrating frames, although "blow back" units have been designed.

Research has developed many new synthetic fibers which are available for the manufacture of filter cloth. The use of these new fabrics has enabled the engineer to utilize the high efficiency of the cloth filter on dust collection applications where the chemical activity, temperature, etc., had not permitted it previously.

Maintaining the system

Since a dust collection system plays such an important part in reducing maintenance work around a plant, it stands to reason that a little bit of effort spent on it in preventive maintenance for keeping it in tip-top shape will pay real dividends.

Dust control systems have, in the past, unfortunately, been subject to an unusual amount of neglect and disregard after installation. Possibly most of this is due to the fact that the installation in itself is non-productive; its chief function in most cases is the abatement of a nuisance.

Many times, also, the responsibility of upkeep has been shouldered onto an already over-burdened millwright who has had to neglect the dust control installation in order to keep actual production machinery in operation. Many times, upon being questioned about the performance of such equipment, the superintendent will say, "It's working fine; we haven't looked into it for several years."

As a means of avoiding this, and also avoiding the plant shut-downs which are made necessary by certain dust collector system failures, the responsibility for the operation and maintenance of dust control equipment should be placed in the hands of a competent engineer or mechanic who should make certain monthly or semi-monthly observations which are suggested here. Copies of his report should be sent to all parties having supervisory interest in the matter.

First inspection immediate

First of all, the first inspection of an industrial exhaust system should be made immediately after its installation. After the final adjustment has been made and the operation of the exhaust system is acceptable, a final set of readings should be taken and made a matter of record. This then becomes the operational standard against which all future tests taken during operation are compared for determining the efficiency level at which the system is operating.

At any time, the suction and air flow readings, as measured with a pitot tube and manometer, should compare with the original readings at the time of

installation of the collector. The readings should be taken under operating conditions that duplicate the original conditions as nearly as possible. It is usually desirable to take two sets of readings, one just after the operation of the filter cleaning device, and the other just before the filters are cleaned.

Where re-circulation is practiced, periodic efficiency checks should be made whether or not visible solids are in the effluent air. These checks should be made by a trained individual using recognized technique. Regardless of the type of dust collector employed, satisfactory operation of the local exhaust system cannot be insured without proper maintenance of the equipment.

Various checking points

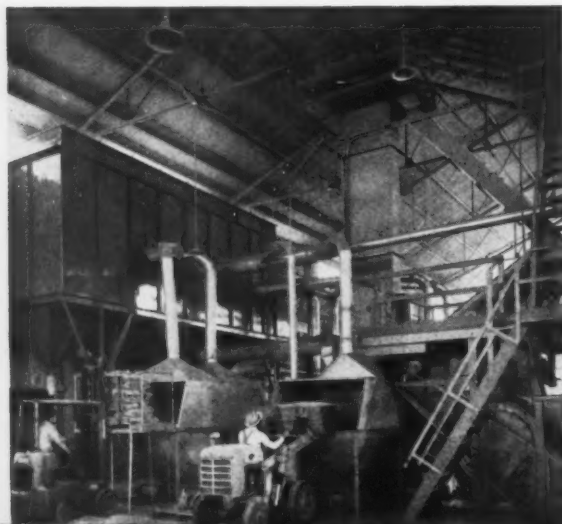
All hoods and piping should be inspected for wear by abrasion. If the interior of the hood is visible, the path of the material can be noted from the appearance of the metal. Backs of elbows and bends in pipe lines and main lines, opposite the entrance of branch pipes, will receive the greatest wear.

Hoods should also be checked for any structural damage, caused by impact with the product being processed. Hood doors should fit tightly. Leaks in pipe lines and collector housings can be detected by noting breaks in soldered joints, etc. Such leaks can often be located approximately by the hissing sound of inrushing air. Soap suds applied to the doubtful points with a brush will definitely locate the leak.

Ducts should be examined for settled dust, so that supports are not weakened, causing the assembly to fall down. By tapping on the bottom of the pipe with a light hammer or other metal object, dust accumulation can be detected by a dead thud, as compared with the hollow sound of a clean pipe. If the collector has spark screens, they should be periodically cleaned and checked.

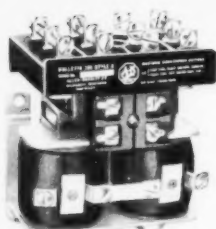
Dust leaks inside the collector on the clean air side can be discovered by entering the collector with a flashlight or extension light and noting excessive accumulations of dust in certain spots. Worn tubes or bags should be immediately replaced. This is easily done if the filters are designed in the form of a large number of independently working cells.

The filter cleaning device should be checked for wear and the need for lubrication at bi-monthly intervals. The inspector should actually enter the dusty air side of the collector to notice the condition of the baffles, etc., and the condition of the filters from this side.

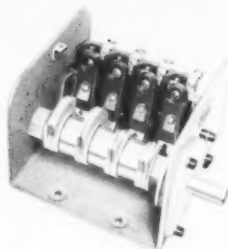


Batching bins are well hooded and ventilated by Dustube cloth-tube-type dust collector at the fertilizer plant of Sunland Industries Inc., Fresno, California.

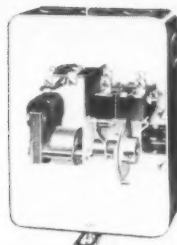
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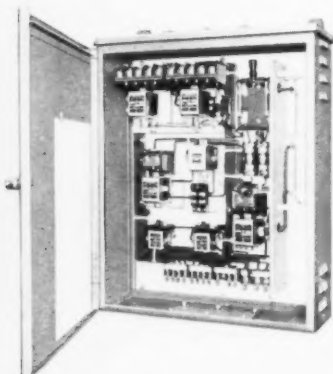
Bulletin 705 Reversing Switch for small a-c and d-c motors



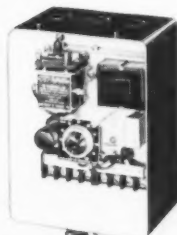
Bulletin 801 Rotating Adjustable Cam Limit Switch, Heavy duty



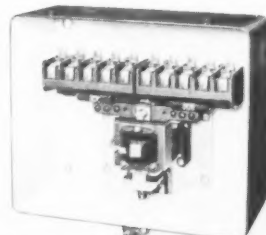
Bulletin 850 Motor Driven Timer for automatic process control



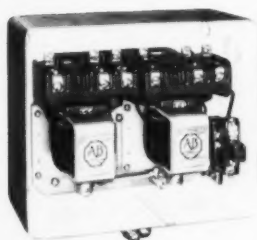
Bulletin 290R D-C Reduced Voltage, Reversing Starter for marine service



Bulletin 852 Electronic Time Delay Relay for precision timing



Bulletin 704 Nine-pole Permanent Magnet Contactor, Noiseless



Bulletin 205 Size 1 Reversing Switch for direct current motors



Bulletin 350 Drum Switch for reversing small a-c and d-c motors



Bulletin 365 Drum Controller for multispeed a-c motors



ALLEN-BRADLEY
MOTOR CONTROL
QUALITY

Some Useful Units in the

ALLEN-BRADLEY LINE

The standard Allen-Bradley line includes a wide range of solenoid operated across-the-line starters, combination starters, reversing switches, reduced voltage starters, and multispeed controls . . . not to mention an extensive variety of relays, contactors, and accessories.

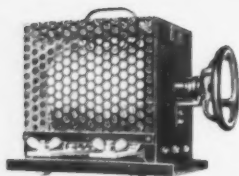
And that is not all!

It also includes many other useful items . . . a few of which are shown here. They find application in the process industries, in marine service, in laundries, and in many other industries. All are designed for long, trouble free life and built to the widely recognized QUALITY standards that apply to the entire Allen-Bradley line.

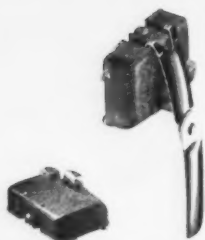
If you use motor controls . . . it will pay you to become acquainted with the latest Allen-Bradley Catalog. May we send you a copy?

Allen-Bradley Co.

1316 S. Second St. • Milwaukee 4, Wisconsin



Bulletin 470 Graphite Disc Rheostat for laboratories



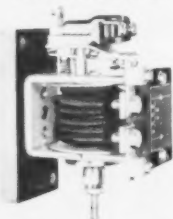
Bulletin 500 Knee and Foot Controllers for sewing machines



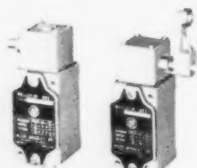
Bulletin 802 Foot Switch for heavy duty, rough service



Bulletin 410 Graphite Disc Rheostat for stepless control



Bulletin 809 Instantaneous Current Jam-type Relay



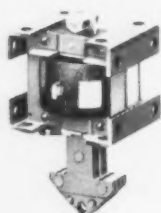
Bulletin 802 Limit Switches with various operating levers



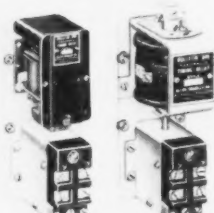
Bulletin 600 Switch with overload breaker and pilot light



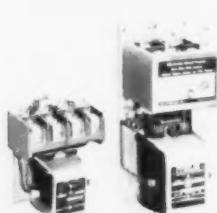
Bulletin 848 Dashpot Timing Relay. Maximum interval 30 sec.



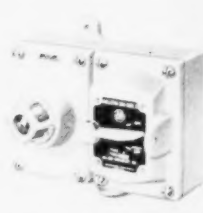
Bulletin 860 A-C Solenoid supplied in variety of ratings



Bulletin 849 Pneumatic Timers for machine tool service



Bulletin 202 D-C Contactors for applications up to 150 amperes



Bulletin 600 Watertight Starting Switch with pilot light



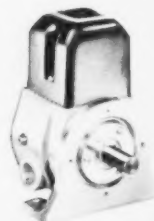
Bulletin 840 Float Switch operated by float and chain



Bulletin 800T Oiltight Push Buttons for machine tools



Bulletin 801 Rocker Arm Limit Switch for reversing service



Bulletin 808 Zero Speed Plugging Switch with magnetic lockout

Popular Accessories in THE ALLEN-BRADLEY LINE



Look for the A-B trademark.
It is a guarantee of Quality

Above are shown a few Allen-Bradley control accessories. The variety of these units reveals the wide scope of the complete Allen-Bradley line. To machinery designers and plant engineers, the Allen-Bradley Catalog is a treasure house of standard control accessories which can be used in innumerable combinations to solve virtually any control problem. May we send you a copy of this Handy Catalog?

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.

ALLEN-BRADLEY

MOTOR CONTROL

QUALITY

WESTERN PINE looks ahead

THE WESTERN PINE industry expects 1953 to be "another year like 1952," Walter S. Johnson told members of the Western Pine Association at their annual meeting in San Francisco. He predicted that housing is heading for another million-unit year. The bulk of pine lumber goes into residential construction. No inflation in market values of lumber is foreseen as a result of price decontrol, with the possible exception of a few select and shop grades.

Phil Creeden, Edward Hines Lumber Co., urged lumber dealers to meet competition by pushing forest products more efficiently in order to "keep the lumber dealer in the lumber business."

Ralph R. Macartney, Klamath Falls, Ore., president of National Lumber Manufacturers Association, urged all lumber companies to make greater use of research facilities operated by Teco, a subsidiary of National.

"Lumber's retention of a reasonable share of present markets, and a greater portion of new markets will depend, to a large extent, on technical developments in the wood products industries within the next few years," he said.

S. V. Fullaway, Jr., of Portland, association secretary-manager, urged the pine producers to develop among their employees a better understanding of economic principles. "Apparently," he said, "many business men are willing to believe, since a new administration has taken office, that the creeping socialism which threatens American progress has now been banished, and that such danger can be forgotten. The real effort is ahead. The situation is still precarious."

CONVERT SOUND TRACK to third dimension

CINEMA ENGINEERING Co., of Burbank, have perfected a control for converting conventional sound tracks of motion pictures to stereophonic, or third dimension, according to Chief Engineer A. C. Davis. This means that conventional films, previously developed for "flat" sight and sound pictures, can be converted into the new stereophonic pictures which have taken the industry by storm.

The new controls, now in production, make a single sound source move across the screen at the will of the operator. As a matter of fact, a number of controls can be used to allow the mixing of actions and sounds that may be actually moving in opposite directions simultaneously.

SLOWDOWN In Assembly?

Not when you bundle with a

SIGNODE

POWER STRAPPING MACHINE!



The happiest, most envied man on the production line—and the pace-setter—is the man on the Signode Power Strapping Machine! His job

is easy and light, and well-strapped bundles roll off the line automatically! But faster continuous output is not the only advantage gained.

Power Strapping Cuts Costs Also

Signode's Power Strapping Machine releases several men for other jobs. It does the job of bundling safe and faster, with uniform tension on every strap. The machine is flexible, handling packages of varying sizes without adjustment. It is highly adaptable, strap-

ping K.D. millwork, soft and hard wood flooring, shingles, crating lumber, expensive trim, etc. Strapped millwork and lumber is easier to handle, stack and tally. It can be loaded faster and enjoys protection from pilferage until used on the job.

Let's estimate your needs

Volume shippers usually have varying strapping needs. Let our fieldman survey your production layout and recommend the power

strapping machine for the job. You'll be under no obligation whatever. Write

* Another exclusive service proved and tested for you by Signode



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this seal means security in shipping



Offices coast to coast.
In Canada: The Canadian Steel Strapping Co., Ltd.
Foreign Subsidiaries and Distributors World Wide



CONTINUOUS production for redwood forests

THERE IS more acreage in privately owned tree farms, operated for continuous growth of commercial timber under good forest practices, in the Redwood Region than in the region's public redwood parks, according to a new publication released by the California Redwood Association. "Virgin forest, unless harvested, is practically useless in providing a constant supply of wood for the betterment of mankind," the publication says.

It is the association's goal to see that all commercially valuable timberland in this area, other than parks and groves, be operated under principles of tree farming. Aim of the tree farm movement is to grow enough timber to replace that harvested to meet the annual demand. Generally speaking, the lumber industry is approaching that balance more closely every year.

This publication, designed principally for use of tree farmers, is available upon request from the California Redwood Association, San Francisco.

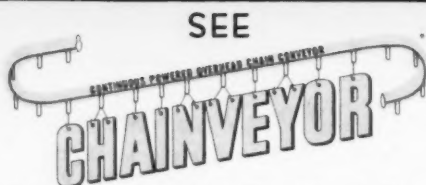
DESIGNING PLANTS to prevent corrosion

"PLANT SITE selection is a very important aspect of designing to prevent corrosion," stated Dr. Robert B. Mears, manager of research and development laboratories of United States Steel Corp., speaking before a joint meeting of the Puget Sound and Western Washington chapters of the American Society for Metals, and the American Society of Mechanical Engineers.

Such a minor consideration as direction of prevailing winds or the difference of a few hundreds yards in the location of a plant may result in a large difference in the corrosive conditions encountered—particularly when industrial and marine atmospheres are considered.

Material selection and corrosion performance of materials were emphasized as most important in plant design. It has been found that curves of resistance to attack, plotted against change in composition of the material, sometimes have unpredictable, large changes of slope.

It was determined that the most important condition to avoid in plant design is the presence of undrained pockets which permit accumulations of corrosive substances with the subsequent evaporation, concentration, and perforation.

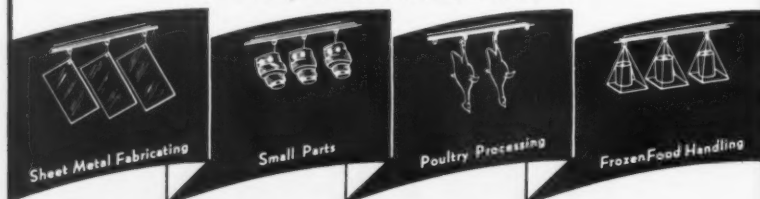


Before Buying Light Trolley Conveyors

Engineered for dependable overhead conveying, the Chainveyor, a light-duty, fully enclosed, continuous chain conveyor is indeed an outstanding performer. Extremely flexible with short radius curves and straight tubular track sections, the Chainveyor is easily installed and adaptable to unusual situations. The Chainveyor is, in fact, completely practical everywhere light overhead conveying equipment is required.

*The Chainveyor is manufactured by United States Spring and Bumper Co. of Los Angeles, Calif., and distributed nationally by Mathews Conveyor Company.

Write Today for Illustrative Bulletin No. CV-52



**MATHEWS CONVEYER COMPANY WEST COAST
SAN CARLOS, CALIFORNIA**

LOS ANGELES
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Engineering Offices and Sales Agencies in Principal Western Cities

now an improved E-6010

the new MUREX[®] type R

Murex now gives you the first real improvement in Type E-6010 electrodes in many years.

A completely redesigned electrode, the new Murex Type R welds with less spatter—digs deep without undercutting—does not spear—takes higher currents with no sacrifice in performance—has outstandingly uniform arc action.

Physical properties too, are excellent—more than you'll ever need in E-6010 applications.

Ask for detailed data—request a demonstration—see how this new, improved TYPE R can give you better, faster welding—how easy it is to use.



Welders like it!



DETINNING
THERMIT WELDING
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ARC WELDING—Materials and Equipment
CHEMICALS and ANODES for Electroplating
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MUREX ELECTRODES

ARC WELDERS

ACCESSORIES



WESTERN FIRES—

Fullerton Mutual Orange Assn., Fullerton, Calif. WATCHMAN at this orange packing plant had several duties in addition to those prescribed for standard watchman protection. Because of these added responsibilities he did not discover this fire in its incipency.

DISASTER struck ten industries in the Western states in 1952, and brought fire and explosion losses totaling \$5,598,000.

National Fire Protection Association figures showed that private protection must be improved measurably to cope with serious fires in industrial plants, particularly where protection is weak. A high percentage of fires occurred in buildings which were made of combustible or partially combustible materials, and where fire division walls had not been installed.

No watchman service was provided in many plants where such a service was deemed necessary, and a high percentage of watchmen who were operating failed to detect or report fires promptly. Lack of water was found to be another major factor in analyzing fire-destroyed plants, as was lack of proper employee training.

Results of large Western industrial fires in 1952 reported by the National Fire Protection Association follows:

July 20, nr. Denver, Colo. Julius Hyman & Co. \$500,000; 1 killed

Insecticide. Explosion of a mixing kettle on the third floor of the 3-story

fire-resistive building killed an employee and damaged the third story. Other buildings were damaged by flying debris. The ensuing fire was confined to a tank of dieldren, an insecticide. The explosion occurred when a catalyst that should have been placed in a kettle in which peracetic acid was to be made was placed by mistake in the wrong kettle. Contents of the latter kettle was not stated but is presumed to have been dieldren.

June 2, Tacoma, Wash. Lilly Seed Co. \$410,000

Fertilizer mixing, seed processing, poison bait mfg. Firemen in their station a mile and a half away were the

first to notice fire that destroyed this block long unsprinklered, 1-, 2-, and 3-story wooden building. Flames were coming from the roof when apparatus arrived, having a good 3½ hours to develop between the time the last employee left and the first tour of the merchant patrol. Although the presence of the Tacoma fire boat would have had little if any effect on the final outcome it is interesting to note that the boat was held up two hours and 35 minutes, first by low tide, and second by a mixup as to whose responsibility it was to raise a bridge. The boat was finally returned to quarters without reaching the scene.

Sept. 7, nr. Phoenix, Ariz. Southwest Cooperative Wholesale. \$605,000

Feed mill, grain elevator, two feed and grain warehouses. At 12:33 a. m., 18 minutes after the watchman reportedly checked a station in the feed mill, fire and smoke was observed coming from the mill by a fireman at Wilson Fire Department headquarters seven blocks away. In all, five fire departments sent apparatus to control the fire that spread through the unsprinklered high 1-story metalclad feed mill to two

National Statistics for 1952

1. Sixty-four per cent of the fires involved delayed detection.
2. Forty-five per cent were so extensive that the fire department on arrival was forced to concentrate on protecting exposures.
3. Thirty-three per cent spread throughout the building of origin and to other structures.

(Top right) American Brass & Iron Foundry—Firemen handicapped by congestion, 7 ft. high fence, insufficient hydrants and railroad tracks.

(Bottom right) Pacific Paperboard Co.—Lack of division walls and prevalence of paper dust meant total loss.

LIT BY LACK OF THOUGHT

*—special hazards,
poor water supply,
watchman failure,
defective pumps,
untrained workers*



unsprinklered wood-frame, metalclad warehouses 10 feet away and to a wooden grain elevator approximately 20 feet distant. These buildings and approximately 3,375 sq. ft. of yard storage area (lumber and other building materials) were destroyed. Delayed discovery, lack of sprinklers and inadequate clearance between the combustible buildings were the principal factors responsible for the loss.

Aug. 12, Edenvale, Calif. Richmond Chase Co. \$315,000

Dried fruit packing and storage; box making. The 1- and 3-story masonry and wooden packing house (18,213 sq. ft. ground floor area), the adjacent 1-story wood-frame, metalclad boiler house (800 sq. ft.), 2-story wooden water tank house (225 sq. ft.), 1-story open sided dipping shed (3,375 sq. ft.) and 900 wooden fruit bins in the yard were destroyed by fire discovered simultaneously by a passerby and police 1/2 mile away at 11:50 p. m. Because of the delayed discovery there is doubt as to whether much if any of the destroyed property could have been saved had a water supply been available. The fact remains, however,

that pumpers were unable to obtain water at the site since the electric power for the well pump had been shut off in the main plant at closing time. The 40,000 gals. of water used to protect exposures and bring the fire under control had to be hauled a mile to the scene. No automatic protection was provided, and although an employee slept in a building on the premises his value as a means of prompt fire detection was nil. At the height of the fire a search was made for this man; he was found asleep although a pumper was operating outside his window.

May 15, Oakland, Calif. American Brass & Iron Foundry. \$394,000

Fire that destroyed this mostly 1-story 32,000 sq. ft. foundry broke out when a batch of pipe preheated to 300 deg. F. was being removed from a dip tank of hot creosote and tar. A short delay in fire department notification ensued as employees first attacked the fire with extinguishers. From the burning dip tank fire flashed through large quantities of iron, coke and brass dust on building members and in suspension and had involved most of the undivided and unsprinklered building when ap-


paratus arrived. Firemen were confronted with several fire fighting handicaps: large piles of coke and scrap iron at the rear of the building, 7-ft. high fences on the sides, insufficient hydrants requiring long hose lays across railroad tracks, and necessity to uncouple hose lines during the fire to allow a train to pass.

Aug. 9, Chehalis, Wash. Perma Products Co. \$379,000

Shingle mill. Two men cleaning a stain machine with solvents, one hour after the plant closed, stated that an arc ignited the solvent when the electric motor was started to move a conveyor. Fire spread rapidly through the solvent vapor and shingle dust and soon had complete control of the unsprinklered 1-story steel-framed, metalclad building.

Nov. 6, nr. Knights Landing Bridge, Calif. Sutter Basin Growers Cooperative. \$620,000

Rice drying and storage. Fire that originated near the top of a bucket elevator in a 118-ft. high dryer building (concrete up to 86 ft. height, wood superstructure) practically destroyed



**"THIS LUBRICANT
EXTENDED
BEARING LIFE
50%"**

—says REPUBLIC AVIATION CORP.
Makers of the famous F-84E THUNDERJET

"Under actual tests, LUBRIPLATE extended bearing life fifty per cent or better as compared to other lubricants. It was also found that, during test, LUBRIPLATE increased efficiency of machines twenty per cent by reducing friction loss. Republic has been using LUBRIPLATE successfully for the past eight years."

For nearest LUBRIPLATE distributor, see Classified Telephone Directory. Send for free 56-page "LUBRIPLATE DATA BOOK"... a valuable treatise on lubrication. Write LUBRIPLATE DIVISION, Fiske Brothers Refining Co., Newark 5, N. J. or Toledo 5, Ohio.

**REGARDLESS OF THE SIZE
AND TYPE OF YOUR MACHIN-
ERY, LUBRIPLATE
LUBRICANTS WILL IMPROVE
ITS OPERATION AND REDUCE
MAINTENANCE COSTS.**



the dryer building and the connecting wood and metal conveyor housing that ran along the tops of 36 concrete storage bins adjoining the dryer. Either an overheated bearing or motor was the probable cause. On discovering the fire at 3:25 a. m. the three employees in the building spent ten minutes trying to control the blaze with extinguishers. When the elevator was stopped an explosion occurred that spread the fire and forced the men to leave. Although the only water available to first arriving firemen was the 720 gals. in their truck tanks, it is possible that they could have controlled the fire with this limited supply had it been used promptly. The first time a 1½-inch hose was taken to the top of the structure a section of the hose burst. The second time the hose pulled away from the men and dropped to the ground level. By then the fire had reached such proportion that firemen could no longer stay in the building. Fire spread from the dryer building through the conveyor housing and into the storage bins. Twelve pieces of apparatus responded but because of lack of water, the extent of fire on arrival and the height of the building, about all that could be done was to protect an exposed warehouse.

Aug. 20, Los Angeles, Calif. Overly Mfg. Co. of California. \$270,000

Metal doorframes and fire doors. As frequently happens where there is no automatic protection or watchman service fire that originated in this plant during the night spread beyond control before being discovered by an outsider at 3:19 a. m. A spark from a substandard refuse burner located ten feet from an aluminum clad wall of the 1-story building is believed to have started fire in an adjoining outdoor sawdust bin. Fire had entered the 13,640-sq. ft. building and was through the roof when apparatus arrived. Efforts were made to prevent sparks and heat from igniting exposures, which was done with commendable success despite the poor water supplies available. The plant was located in a district formerly residential and supplied by 4-in. and 6-in. dead end mains. When one poor stream was obtained from the nearest hydrant (500 ft. distant on a 4-in. main) residual pressure was practically zero. The water supply was also said to be responsible for the absence of sprinkler protection. It was so weak that a sprinkler system supplied only from mains would not be adequate to classify the buildings as "sprinklered" for insurance credit purposes, and apparently the owners did not consider that the size of the plant justified an elevated storage tank.

**If in carelessness you persist . . .
your fine new plant may burn to bits.
So heed the tale that here is told . . .
check your needs to save your gold.**

Jan. 11, nr. Longview, Wash. Pacific Paperboard Co. \$1,805,000

Newsprint and cardboard. The entire paper machine building comprising an undivided area of 140,000 sq. ft. was destroyed by fire that originated at the ceiling above a paper machine. Cause was undetermined. Fire-spread was so rapid through refuse and paper dust that employees had to abandon the four private hose streams placed in operation. The plant had no sprinkler protection and was located in an area without public protection. Apparatus from Longview and Kelso had difficulty in gaining access to a river, although the resulting delay probably had no influence on the outcome due to the extent of fire when apparatus arrived.

Oct. 22, Fullerton, Calif. Fullerton Mutual Orange Assn. \$300,000

Washing, grading and packing oranges. Destruction of the 15,300-sq. ft. 1-story masonry, wood-joisted packing building and damage to the roof of the adjoining maintenance shop was due to several fire protection weaknesses, among them substandard watchman protection and absence of sprinklers. The fire originated in the basement and was caused by friction of V-belts against a flywheel. When the 3-inch shaft snapped, the flywheel sagged against the moving belts. The resulting friction heat eventually ignited the belts and shaft housing. Had provision been made for prompt detection and control of fire at this plant the damage would undoubtedly have been minor. However, automatic protection was not provided and the watchman had several additional duties, including supervision of the public scales across the street, so that it is not surprising that the fire burned for some time until discovered by a maintenance man reporting for work at 6:03 a. m. Fire spread rapidly up numerous unprotected vertical openings to the first story and mezzanine and involved the wood roof before apparatus arrived. A parapeted fire wall was instrumental in saving most of the adjoining maintenance shop, although the effectiveness of the wall was weakened by a wood enclosed bucket conveyor that extended from the basement to roof of the packing building, then over the parapet and into the maintenance shop. Fire spread through conveyor to roof of the maintenance shop.



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PERMANENT PIPE-LINE SECURITY

From *Master Craftsmen* come the world's finest *FITTINGS* . . . drop forged from solid billets of specially blended *STEELS*.

Your pipe connections can be harmonious and lasting . . . even endure beyond the normal life of the system . . . if proper consideration is given the compatibility of their meeting. Many millions of feet of pipe and tubing have been brought together by W-S Double-Diamond Forged Steel Fittings in lasting unions against time . . . heat . . . pressure . . . turbulence . . . corrosion . . . oxidation . . . vibration . . . reduction and shock.

Such fortunate meetings withstand the adverse conditions of *ANY* service environments because W-S FITTINGS are inherently superior to those made by methods other than *PRECISION MACHINING* from solid *FORGED* stock.

Whatever your pipe or tubing application, you can profit from the permanence of W-S Double-Diamond (Screw-End and Socket-Weld) Forged Steel Fittings.

SOLD THROUGH LEADING DISTRIBUTORS



WATSON-STILLMAN FITTINGS DIVISION

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136 ALDENE RD., ROSELLE, NEW JERSEY



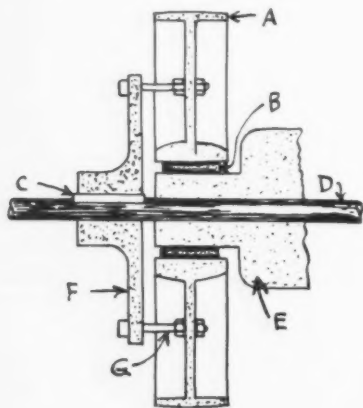
HANDY HINTS for

PLANT ENGINEERS

Contributed by W. F. S., Mechanical Engineer

SHAFT DEFLECTION how to avoid it

THIS SKETCH shows how to eliminate every bit of belt pull from a shaft bearing so there will be no shaft deflection. Less space is required, and instead of two additional bearings as are sometimes used, there is only one—a roller bearing which consumes less power than ordinary plain bearings.



Turn down the housing E of the motor if possible, or, cast such a housing and attach it to the motor and then mount the pulley on this housing, equipping it with roller bearings B between the pulley and hub. All belt pull then falls directly on the shaft housing. The flexible coupling F is keyed onto the shaft D and is connected to the pulley A by means of bolts G, or by other means familiar to all who use flexible couplings.

With this method the force on the shaft is purely a twisting or torsional action—an ideal condition. There can be no binding, consequently friction is reduced to the minimum. There is no longer that undesirable overhang, and, in addition, space is conserved.

Ball bearings may be used if desired, or, if roller or ball bearings are considered too expensive, simply use a plain bearing instead of the anti-friction type. The first cost of this arrangement may be somewhat greater, but in many instances first cost is of much less importance than space and

power saving and the elimination of belt drive troubles.

* * *

YOUR EQUIPMENT does it need oiling?

DON'T EVER allow oiled equipment to operate until it is without oil. If it is a fan, electric motor, water motor, engine, or anything of the sort, it needs oil. Don't let it get "dry."

The simplest way in which to determine whether or not equipment needs oiling is to note whether or not it stops abruptly as soon as the power is turned off.

For example, take an ordinary electric fan. If the fan is properly oiled it will run along for some time after the switch is turned, due to its own momentum. If it is not properly oiled it will stop quickly. The dryer it is, the quicker is the stop.

It is therefore a good habit, when you turn off equipment of this sort, to watch it for a moment after the power is turned off. If it stops abruptly, it certainly needs oil. If it runs along normally and easily, coming to a halt gradually, its condition is safe.

* * *

PIPE INSULATION should you inspect it?

NOT LONG AGO an interesting article on pipe insulation appeared in a prominent publication. This writer's attention was arrested particularly by the statement that pipe insulation should be inspected at rather frequent intervals, "contrary to the practice" of many users of insulation.

That statement caused the writer to wonder what an engineer friend of his would say about it—the chief engineer of a large concern that manufactures insulation. Knowing that it is not uncommon for some manufacturers to say regarding their product: "Install it and forget it," this question was put up to the chief engineer for an answer: "If the insulation were installed by you, is this statement true?"

It was the writer's guess that the statement would be ridiculed by the chief engineer and that he would say

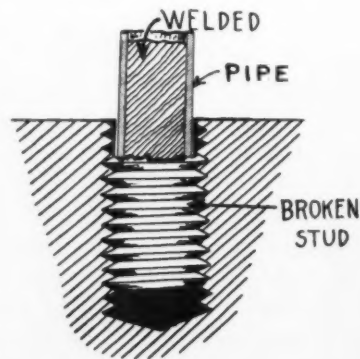
in effect, "Don't pay any attention to what that gentleman says. He doesn't know what he is talking about." Instead of that, this is what he wrote, which practically verifies the questioned statement:

"I never quarrel with a statement of that nature. Pipe covering, in general, is lucky to get any inspection, and if an article such as this makes the operator look at it once a year, all well and good. There is no such thing as too frequent inspection, from the manufacturers' point of view."

* * *

BROKEN STUD easily removed

IF YOU are equipped with a welding outfit, or if you are going to get one, here is a kink that will interest you for removing an "un-get-at-able" broken stud.



Get a short piece of pipe that will fit loosely into the opening, as indicated in the sketch. The welding outfit is then used to fill the pipe with enough molten metal so that the pipe will be firmly welded to the stud. The pipe, at the same time, prevents the molten metal from becoming welded to the threads.

Then, when firmly welded, the stud is readily removed by means of a pipe wrench applied to the pipe stub. The removal process is also aided due to the heating of the stud which expands and thus aids in the loosening of the threads so that the stud can then more easily be removed.

Flash!

On April 6,
we opened a
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DIRECT FACTORY BRANCH

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at 923 East Third Street
Los Angeles 13, California

to serve Industries, Consulting Engineers, and Contractors
in the Pacific Coast and Mountain Areas.

Sales, Service and Shipments of the broad line of ASCO Solenoid Valves and Electromagnetic Controls to the following counties in Southern California: Santa Barbara, Los Angeles, San Diego, San Bernardino, Riverside, Imperial, Orange, San Luis Obispo, Ventura.

Shipments from our Pacific Coast Warehouse to the following States which will continue to be served by our long established representatives of these states: Washington, Oregon, California, Idaho, Nevada, Utah, Arizona, New Mexico, Colorado, Wyoming, Montana, Texas (El Paso only).

Automatic Switch Co.

385-W Lakeside Avenue, Orange, New Jersey

ALBUQUERQUE, N. M.
Automatic Equipment Co.
4607 Los Lomas Rd.
(valves)

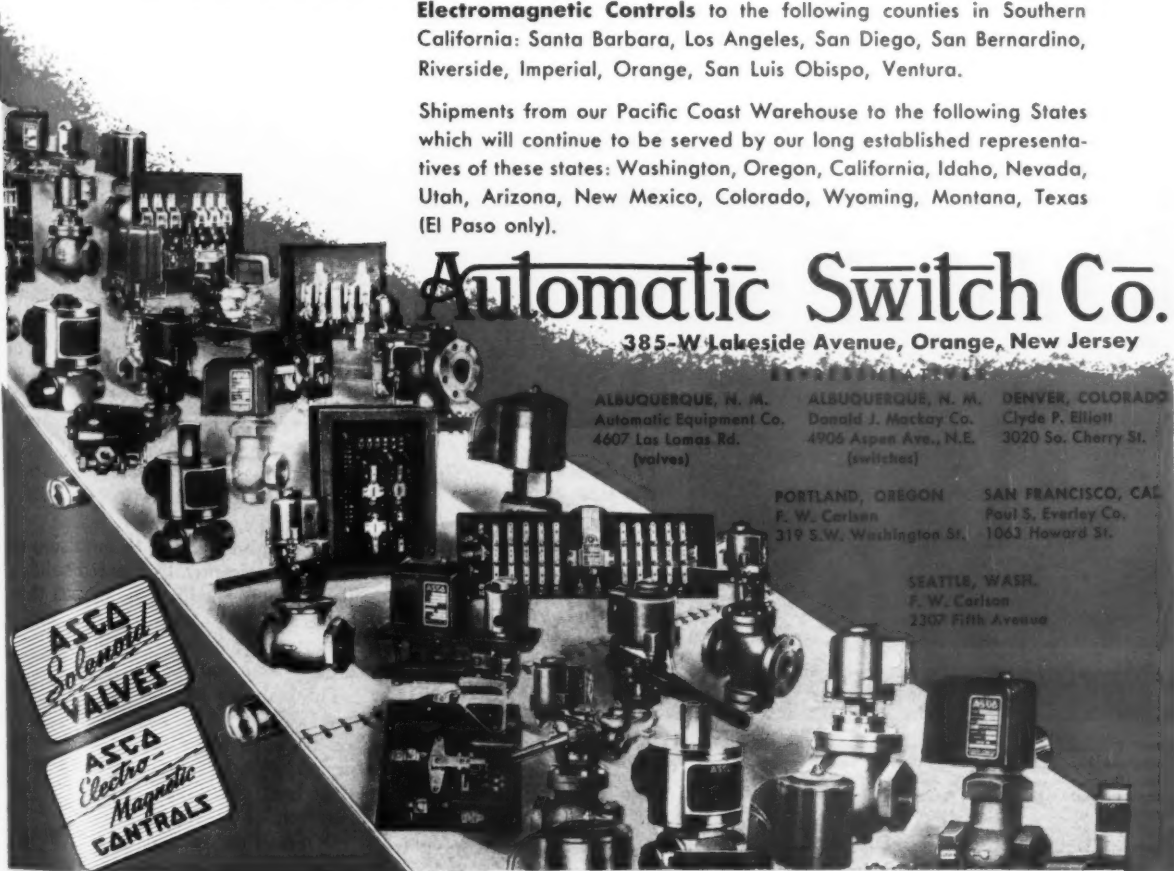
ALBUQUERQUE, N. M.
Donald J. Mackay Co.
4906 Aspen Ave., N.E.
(switches)

DENVER, COLORADO
Clyde P. Elliott
3020 So. Cherry St.

PORTLAND, OREGON
F. W. Carlson
319 S.W. Washington St.

SAN FRANCISCO, CAL.
Paul S. Everley Co.
1063 Howard St.

SEATTLE, WASH.
F. W. Carlson
2307 Fifth Avenue



Don't Gamble on Fire Protection



Lady luck may not always smile! A costly and disastrous way to tempt her frown is to gamble on fire protection for your plant.

A Horton elevated tank with a sprinkler system is one of the best ways to provide a plant with adequate fire protection. The Horton elevated tank shown here is providing a dependable gravity water supply for the Robertshaw-Fulton Controls Company plant at Anaheim, Calif. This 100,000-gal. Horton elevated tank provides the primary water supply for a sprinkler system that protects the plant's entire area of 58,000 sq. ft.

Horton elevated tanks with ellipsoidal-bottoms are available in standard sizes from 15,000 to 500,000 gals.—with radial-cone bottoms from 500,000 to 3,000,000 gals. Write our nearest office for estimates or quotations.



The 100,000-gal. Horton elevated tank above is helping protect the Robertshaw-Fulton Controls Company plant at Anaheim, Calif. from disastrous fires such as this.

CHICAGO BRIDGE & IRON COMPANY

Atlanta 3.....2144 Healey Building
Birmingham 1.....1563 North 50th Street
Boston 10.....1065-201 Devonshire Street
Chicago 4.....2132 McCormick Building
Cleveland 15.....21256 Midland Building
Detroit 26.....1567 Lafayette Building
Havana.....402 Abreu Building

Houston 2.....2164 C & I Life Building
Los Angeles 17.....1570 General Petroleum Building
New York 6.....3334-165 Broadway Building
Philadelphia 3.....1666-1700 Walnut Street Building
San Francisco 4.....1578-200 Bush Street
Seattle 1.....1369 Henry Building
Tulsa 3.....1667 Hunt Building

Plants in: BIRMINGHAM, CHICAGO, SALT LAKE CITY, and GREENVILLE, PA.

CONTINUOUS MUSIC from reversible tape

CONTINUOUS MUSIC as a background for industry, commerce, etc., is now possible on a continuous magnetic tape playback machine capable of providing eight hours of program without repetition. The machine is built by Ampex Electric Corporation, Redwood City, Calif.

To obtain these lengthy playback times, an ingenious device is utilized in that program to be played is recorded on only half the width of a standard 1/4-in. tape moving in one direction. The tape is then reversed and the remaining half of the program material is recorded on the second half-width of tape traveling in the opposite direction.

At the end of tape, an inaudible tone is recorded which automatically reverses the direction of tape by means of a tone-detector. At end of the second track, another tone reverses the tape and starts entire eight-hour cycle again.

CUTTING COOLANTS in aircraft tools

IN AIRCRAFT plants there is a limited amount of production of any one part as compared with the automotive industry, yet the same tool must be used for operations on ferrous metals, aluminum alloys, and magnesium.

When machining magnesium, a straight oil—not water solution—must be used. While a low viscosity straight cutting oil may be also used for light-duty machining of aluminum, it will not be efficient on heavy duty aluminum, or for most steel jobs. Therefore it is suggested that certain tools in the shop be set aside for magnesium work alone, or for this and light duty aluminum jobs.

For heavy jobs and for ferrous metals other machine tools containing a 1 to 25 mixture of a fortified cutting base and water, can be profitably employed.

For grinding, a 1 to 60 emulsion of a special antiseptically treated soluble oil is recommended. This means that two straight oils and two water-soluble coolants will handle practically all machining of aircraft parts.

The primary function of a cutting fluid is to reduce the coefficient of friction between the tool and the metal chip. A secondary function is to carry away heat produced in the cutting operation.

A reduction in the coefficient of

Continued on page 64

why splice

needlessly?



DURASHEATH goes **all** the way—underground, overhead, in ducts—without splices

Splicing cable is time-consuming . . . and costly. What's more it is avoidable. All-purpose Durasheath® can be used for almost any distribution need up to 5 kv. ** It can be run in one continuous length, regardless of location . . . buried underground . . . strung overhead . . . or easily pulled through ducts. No expensive splices are necessary . . . no weak power links . . . no cluttered inventory. One cable—flexible, light Durasheath—goes all the way. You can stock *one* type instead of *three*.

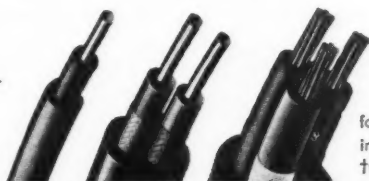
Durasheath handles easily and is used in self-supporting aerial assemblies. Its rugged neoprene jacket resists moisture, chemicals, sunlight, organic decay, corrosion, electrolysis, abrasion, and mechanical injury.

For *reliable* power distribution at *lower* installation cost, insist on versatile Durasheath. See your nearest Anaconda Sales Office or Distributor. Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York.

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the right cable for the job

available in all sizes —
from large to small —
one to three conductors —
**can be supplied for
services up to 15 kv.
Consult Anaconda for
recommendations.



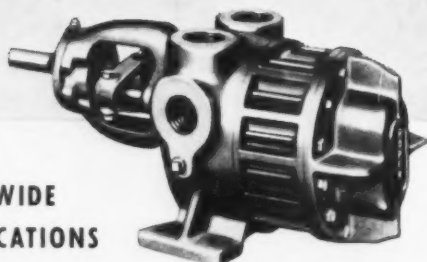
ANACONDA® wire and cable

for traffic control, airport† power and lighting, mines,
industrial plants, railroads, street lighting and many other uses
†when ordered to CAA Specification L-824

ANACONDA ON THE PACIFIC COAST: Plant at: Orange, Calif. District Offices at: Los Angeles, Calif.; San Francisco, Calif.; Seattle, Wash.

Install **ROPER** **ROTARY PUMPS**

for Positive Results



**MODELS FOR AN
EXCEPTIONALLY WIDE
RANGE OF APPLICATIONS**

**SERIES F
PUMP**

SERIES	TYPICAL USES	PRESSURES	SIZES
3600	All Petroleum Handling Grease Compounding Oil Circulating General Transfer	to 60 P.S.I.	40-300 G.P.M.
F	Pressure Lubrication Hydraulic Power Fuel Transfer Lube Oil Transfer	to 300 P.S.I.	1-300 G.P.M.
K	Pressure Lubrication Hydraulic Service Industrial Oil Burner Fuel Supply	to 150 P.S.I.	¼-50 G.P.M.
H	Hydraulic Power Test Equipment Pressure Lubrication High Pressure Coolant	to 1000 P.S.I.	5-75 G.P.M.

CUTTING COOLANTS

... Continued from page 62

friction between the tool and the chip by a cutting fluid produces the following: an improvement in type of chip formation; a reduction in the rate of tool wear; a reduction in the power required for any particular machining operation.

A solid lubricant prevents the welding together of a portion of the chip with the working area of the tool. Factors affecting the formation of the anti-welding solid lubricant follow: Quantity of cutting fluid reaching the point of reaction; rate of reactivity of the active portions of the cutting fluid with the chip metal; temperature at the tool point; resistance of the solid lubricant film to displacement from the point of contact between the chip and the tool; pressure at the working edge of the tool.

Antisep All-Purpose Base, produced by E. F. Houghton & Co., has unusual properties as distinguished from the average "water-soluble" oil that is merely a mineral oil plus an emulsifying agent. These characteristics include: high wetting-out properties to assure effective flow of the coolant to the chip-tool interface; high sulphur content and polar-type fat additions, producing a solid anti-weld lubricant between tool and chip; reduced coefficient of friction between chip and cutting tool, particularly at faster cutting speeds; antiseptic properties; superior rust properties.

ACCIDENT PREVENTION leads to safety award

HERE IS HOW Lockheed Aircraft Service, Inc., took first place in the transportation division of the Greater Los Angeles National Safety Council contest for 1952—

Early in the year management decided to tighten up on safety, and so got a 12-man committee together to make every effort to see that all safety precautions were carried out. The safety committee was made up of half management and half salaried employees.

If a worker was observed working with a torch without goggles he was handed a slip and reminded that he was endangering his own eyes and life, as well as those of his fellow workers. If a machine needed more guards, they were improvised and placed where they would do the most good. This case of thought plus action did everything possible to insure that safety would be observed very strictly throughout the plant.



NEW! LATEST EDITION OF THIS
BOOKLET NOW READY FOR
YOU! SEND FOR YOUR FREE COPY

A valuable guide covering important fundamentals of estimating requirements of the average pumping job. It includes tables, charts, sample problems, and other pertinent data. SEND COUPON BELOW.

Geo. D. Roper Corporation, Pacific Coast Office, Pump Division
2011 S. Santa Fe Ave., Los Angeles 21, California
Please Send Booklet—"How to Solve Pumping Problems"

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ROPER
Rotary Pumps

High Production at Low Cost Demands the Right Lubricant for each job.

THAT'S RIGHT, JIM...GENERAL PETROLEUM HAS THE MOST **COMPLETE LINE OF INDUSTRIAL LUBRICANTS** OF ANY COMPANY.

NOT AT ALL...THE FEW EXTRA PENNIES YOU SPEND FOR THE **RIGHT LUBRICANTS** COULD SAVE YOU THOUSANDS OF DOLLARS IN DOWN-TIME...LOTS MORE THAN YOUR TOTAL LUBE PURCHASES FOR TWO WHOLE YEARS.

YES, BUT WON'T THAT COST ME A LOT MORE MONEY?

NOT ONLY THAT, OUR LUBE ENGINEERS HAVE THE **KNOW-HOW** IT TAKES TO ASSURE YOU OF GETTING HIGH PRODUCTION AT LOW COST.

THAT'S WHY G.P. LUBRICANTS, MORE THAN ANY OTHERS, ARE **SPECIFIED BY EQUIPMENT MANUFACTURERS** ON THEIR RECOMMENDATION PLATES.

WELL, YOU HAVE A POINT THERE.

SOUNDS LOGICAL ENOUGH TO ME, DON...AND I'VE HEARD ABOUT YOUR FINE SERVICE. LET'S GIVE IT A WHIRL!

Large or small, your plant will benefit from General Petroleum's policy of the **RIGHT** lubricant in the **RIGHT** place at the **RIGHT** time. Backed by more than 87 years of lubrication experience, G. P. today serves most of the West Coast's leading industrial plants. Call your nearest G. P. office today for a discussion of your production problems.

MODEL C-27	McKENZIE TOOL CO.	SERIAL 16921-C
LOS ANGELES, CALIFORNIA		
MILLING MACHINE LUBRICATION RECOMMENDATIONS		
WHEELS, BEARINGS, AND PINIONS	PREPARED	General Grease 888, No. 1
MOTOR, LEADS, RATES, AND PINIONS	HAND	General Grease 888, No. 1
TOOTH, WAYS, LEAD SCREW, AND BEARING SUPPORT	OIL CAN	General Grease 888, No. 1



GENERAL PETROLEUM CORPORATION
converting nature's gift for better living



This bulk tank truck is fitted with two motor-driven conveyor systems to facilitate loading and unloading of animal and poultry feed. The body and conveyor system is built by Goldsberry Machinery Company, and the chassis by White Motor Company.

M-H FEED TRUCK CONVEYOR SYSTEM

eliminates manual handling and expedites direct delivery

AN EFFICIENT and economical conveyor system for loading and unloading animal and poultry feed has been built into Larro Feed trucks, operated by Sperry Division of General Mills, Inc. headquarters in San Francisco. This body and conveyor system permits direct delivery without handling equipment, and makes sacking of feed virtually obsolete.

The conveyor system is a chain and paddle type driven by either power take-off, or its own motor, usually a two-cylinder air cooled eight to twelve hp. unit. Gearing of the motor or power take-off must provide 200 to 225 rpm. on the conveyor shaft. Both conveyors, one within the tank and the other in the discharge boom, run off the same power source at the same speed, but otherwise operate separately.

How it works

The system within the tank pulls feed to the front part of the tank and then back to the uppermost rear part by means of a diagonal, enclosed chute through which the conveyor runs. From this point the tank conveyor dumps feed into a discharge boom where it is picked up by the boom's conveyor. Feed flow into the conveyor system in the truck's bottom is con-

trolled by gates above the conveyor. Feed is discharged into storage bins of various types, usually about 12 to 17 feet above the ground.

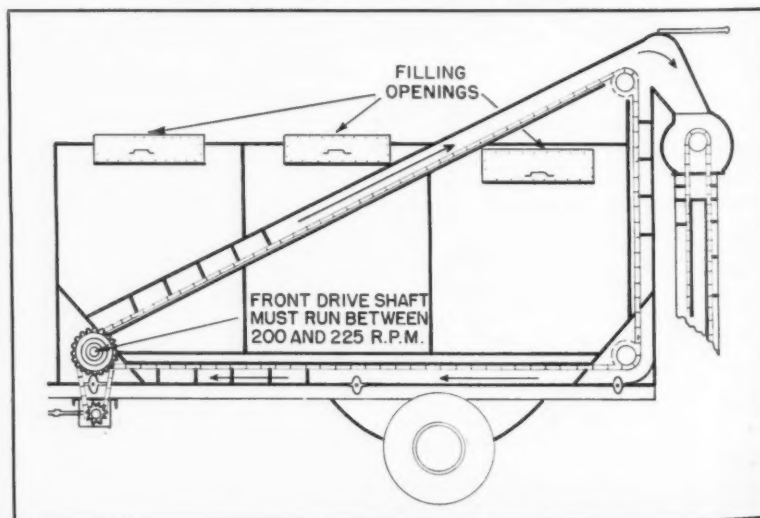
High feeds

Feeds can be delivered to heights of 17½ feet above the ground with this system, and in a lateral arc of 180

deg. The maximum discharge for animal feed is about 1,400 lbs. per minute, or a nine-ton load in less than 15 minutes.

All of General Mills bulk feed trucks use this body and conveyor system built by Goldsberry Machinery Co., and mounted on a White model 3000 chassis.

Goldsberry bulk delivery unit





America's New Railroad

*What's that surveyor doing? He's sighting on tomorrow...
clipping off an old curve... clipping off the past...*

It goes on day after day on the Santa Fe. Building new.

Till there's nothing left that's *old* today of the Atchison, Topeka and Santa Fe but the country and the song and the pride of its people!

IN THE PAST 5 YEARS... Whole fleets of streamlined trains replaced with finer streamlined trains... Enough new track laid to more than reach from Chicago to Los Angeles... Great new "hump" yards built to speed switching... New roadbed, new rail and new ballast methods—for smoother, safer rides for goods and people.

IN THE PAST YEAR... New freight stations, with new towveyors, at Chicago and San Francisco... Great new construction started to raise Santa Fe rails in Kansas and Missouri above the highest flood stage of recorded history.

IN THIS YEAR... New micro-wave communication system put in service between Galveston and Beau-

mont, Texas... New freight classification yard will be opened at Belen, New Mexico.

AND IN THE NEXT YEAR... More curves will be clipped, more grades reduced... 119 new diesel units will go to work... New modern diesel shops will be completed... 3600 new freight cars will be placed in service... New electronic communication and control equipment will be installed... and El Capitan will be re-equipped with all new chair cars!

AND IN THE NEXT 5 YEARS... New cars and whole new trains will be rolling on an ever *newer*, greater Santa Fe.

It costs Santa Fe millions (not one penny from the taxes you pay) to keep America's New Railroad *growing newer every day*.

SANTA FE SYSTEM LINES

PROGRESS THAT PAYS ITS OWN WAY

**BE
CERTAIN**

GET

BRONCO
Certified

the portable cords and cables with
60% by weight Neoprene jackets.

BRANDED!



BRANDED JACKETS!

No mistake... You know you are getting *Certified*. You read at a glance cable type, size, voltage, "P116BM"... which indicates approval by the Pennsylvania Bureau of Mines, and acceptance for listing by the U.S. Bureau of Mines. Easy to measure... "Bronco" is repeated every 2 feet.

With **Bronco 60 Certified** you know you are getting a full 60% by weight of Neoprene in your cable's protecting jacket because its contents are certified.

More Neoprene makes long-lasting Bronco 60 Certified more resistant to oil, acids, alkalis, ozone, gasoline, salt water.

In addition, with **Bronco 60 Certified** you get: 1. Cold Rubber Insulation. 2. Branded Jackets. 3. Superior Flexibility.

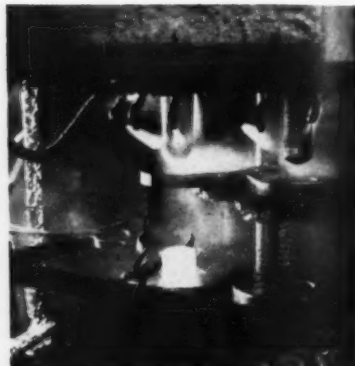
So, BE CERTAIN, GET CERTIFIED — the greatest cord value on the market!

SOLD NATIONALLY BY ELECTRICAL WHOLESALE DISTRIBUTORS

WESTERN INSULATED WIRE CO.
Los Angeles 58, California

**EXTRUDING PUNCH
has long life**

EXCEPTIONAL service life is reported for a Cr-Mo-W extruding punch and finish insert die used in hot cupping operations for 81 mm. mortar casings. Normal life expectancy of an extruding punch used in this type of operation is only 3,000 to 5,000 pieces. This punch produced from Bethlehem Pacific's Cr-Mo-W tool steel made 30,860 pieces and even then had not broken when removed.



EXTRUDING punch (right) and finish insert in action during hot cupping operation.

With dies used in the finish insert operation, 15,000 pieces is considered a very good run. Rheem Manufacturing Company's die turned out 15,000 pieces, was then polished and put back in operation, after which it ran 78,000 to 80,000 pieces before being removed.

The dies were forged from billets, machined to design shape, then heat-treated to Rockwell C-50.

The mortar casings start out as 5.1-lb. slugs sheared from 2½-in. Bethlehem Pacific rounds. These are hot cupped in three operations, then cold drawn to a finished mortar projectile shape. The hot cupping operation is performed in three stages; first the slug is upset; second, a cup is formed; and third, the cup is given its final shape which must adhere to a very close tolerance.

**AIRESEARCH EMPLOYEES
win suggestion awards**

EMPLOYEES of the AiResearch Manufacturing Co. plants at Los Angeles and Phoenix received a total of \$49,100 in awards from the company's suggestion program during 1952. This was an increase of 67% over the previous year. Top money winner was Perry L. Feagans, who collected \$3,025 for his suggestion outlining a new method of machining turbine wheels.

WESTERN INDUSTRY—April, 1953

Your Lyon Dealer is a 26 LETTER MAN!

from **A**utomotive plants, **B**usiness offices, **C**hurches
and **D**epartment stores to **W**arehouses, **X**-ray manu-
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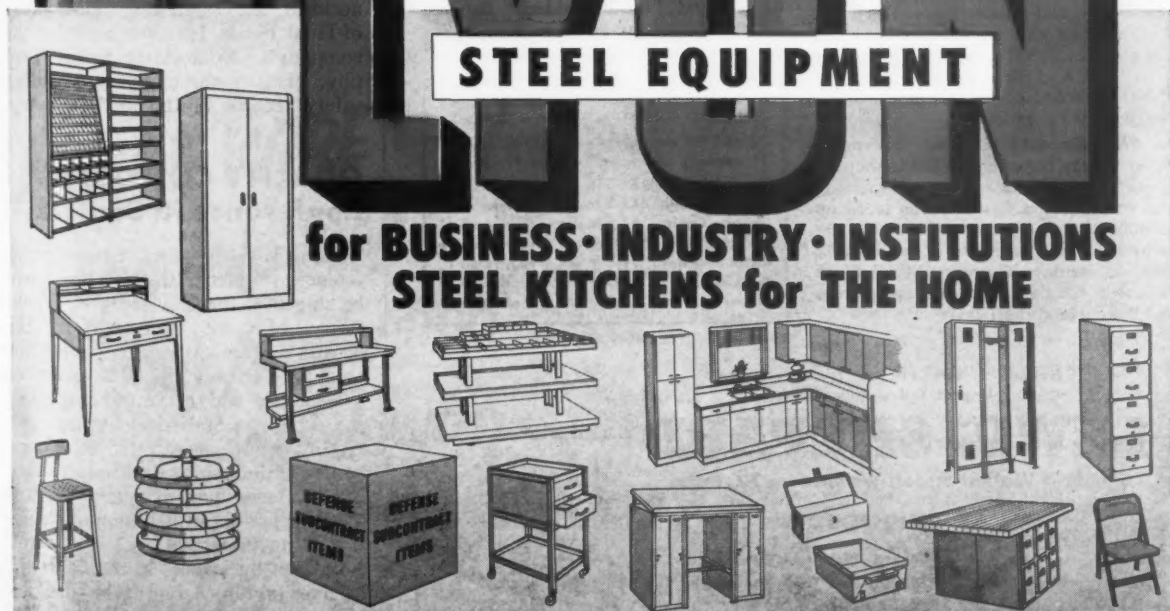
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- Tool Stands
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Efficient use of every cubic foot of space is more important than ever with today's high construction and operating costs. That's why Lewis-Shepard SpaceMaster Electric Fork Trucks are so popular with leading companies who have learned the tremendous economies of mechanized handling.

SpaceMasters are noted for their compact design and greater maneuverability. Aisle widths can be held to absolute minimums . . . valuable extra space put to work. And SpaceMasters have an enviable record of dependability under heavy duty operation.

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When you compare Lewis-Shepard Electric Trucks — feature for feature — you'll see why leading companies in every industry pick them. Their many unique design and engineering advantages, outstanding maintenance records, and greater dependability add up to the best dollar-for-dollar value on the market today. Want proof? Send for Comparison Charts and "Proof Folders" showing L-S Trucks on-the-job. Use coupon for convenience.

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Elec. Gds. Mfg.	41 L-S in use — reordered	13
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Paint Mfr.	1 L-S in use — reordered	6
Motor Transport	1 L-S in use — reordered	12
Auto Mfg.	4 L-S in use — reordered	1
Bottler	2 L-S in use — reordered	5

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FASTEST BIG flying boats

A FLEET of Convair R3Y-1 "Trade-wind" transport seaplanes will be the fastest big flying boats in the 40-year history of waterbased aviation. Top speed of these new flying boats is more than 350 miles per hour. They will cruise long distances at nearly double the speed of existing transport flying boats while carrying the same or greater payloads. On the Navy's longest supply routes a substantial payload can be hauled at approximately 300 mph.

This is said to be the first flying boat to be equipped with air conditioning and high altitude pressurization systems. The 80-ton turboprop transports can take off fully loaded in 30 seconds. Built-in, multicell compartmentation below the cabin floor level provides water-tight integrity, and also leaves cabin free of bulkheads and other obstructions which heretofore have hindered cargo and passenger accommodations in large seaplanes. Magnesium provides the plane with a very tough yet light-weight cargo deck able to withstand the heaviest duty.

NO-ACCIDENT safety trophy

IN RECOGNITION of a record of 1,068,918 man-hours operated during 1952 without preventable lost-time accident, the Fullerton, Calif., plant of Hunt Foods, Inc., was awarded the company's "No-accident Safety Trophy." This is one of the outstanding safety records in the food industry.

QUALITY CONTROL Conference in Seattle

THE FIRST quality control conference ever held in the Northwest will be staged at the University of Washington May 8-9, sponsored by the Seattle Section, American Society for Quality Control, the University of Washington and the Seattle chapter of the American Statistical Society.

May 8 will be devoted to a condensed training in and introduction to modern techniques in quality control methods and an explanation of statistics as an important tool in control. Addresses by leaders in the field will be given on May 9, one of the speakers being Dale Lobsinger of United Air Lines, Denver, who has applied statistical quality control to office, clerical and service procedures with notable success. (See article by Lobsinger, *Western Industry*, May 1951.)

WESTERN INDUSTRY — April, 1953



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PREPARING AND UTILIZING

SAFETY CODE IN YOUR PLANT

ONE OF THE BEST ways to promote safety education among employees is the preparation of a safety code designed expressly for each job, and giving a positive, detailed approach to all information needed by either a new employee or an old hand. This was the theme of a talk by James W. Brykit of Phelps Dodge Corp., Ajo, Arizona, at the National Safety Con-

gress recently held in Chicago, Illinois.

Phelps Dodge has outlined an effective approach to the construction and application of a Code of Safe Practices summarized as follows:

Heads of each operating division are responsible for the carrying out of the program. The decision as to the type of safety codes to be prepared, the number required to cover the op-

eration adequately and the selection of the person best qualified to do the writing rests with the division superintendent.

For the preparation of each code it is necessary to select a writer who is thoroughly familiar with all phases of the work he is to describe, preferably one who has had actual experience on the job. Neither technical training nor writing experience is essential for a code writer, so long as he is able to express, in intelligent language, his own thoughts and those he obtains from fellow employees and other sources, about the job he is to describe.

Safety codes prepared on the job are usually most effective, since workmen are more familiar than anyone else with the details of the job and methods for doing it safely. The writer being chosen, should be provided with necessary materials, reference books, and if available, safe practice codes from other organizations. An isolated place to work, and manufacturers' catalogs, drawings, and pamphlets on maintenance of equipment are also desirable for best results.

Outline helps

Use of a standard outline helps the inexperienced writer to organize his material, thereby reducing the time required for preparation, and it assures the writer that all pertinent information is included in the code.

Selection of a suitable outline for safety code writing should be carefully constructed with the particular purpose for which the code is intended firmly in mind. At times it is advisable to prepare a tentative code for jobs which are expected to be temporary or for new jobs. Time being of the essence, it is often sufficient to use a short form or outline to acquaint the workman with essential information concerning the nature of the job and hazards that may be encountered.

Experience indicates that the most practical way for a writer to obtain reliable information for code writing is to spend considerable time on the job. He should stay in close contact with the operation to be described and discuss every detail of the job with all employees engaged in that particular operation with a view toward obtaining viewpoints and suggestions from

SHIPPERS..

5 QUESTIONS FOR '53*

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- 2 DOES YOUR CONTAINER ASSEMBLE AND CLOSE IN LITERALLY SECONDS?
- 3 WILL YOUR CONTAINER ABSORB SHOCK, OR TRANSMIT SHOCK TO YOUR PRODUCT?
- 4 DOES YOUR CONTAINER'S LIGHT WEIGHT REDUCE TARE WEIGHT, FREIGHT BILLS?
- 5 WILL YOUR CONTAINER STACK SAFELY, STURDILY?

YES	NO
<input type="checkbox"/>	<input type="checkbox"/>
YES	NO
<input type="checkbox"/>	<input type="checkbox"/>
YES	NO
<input type="checkbox"/>	<input type="checkbox"/>
YES	NO
<input type="checkbox"/>	<input type="checkbox"/>
YES	NO
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those who are most vitally concerned.

Opinions will vary and the process of fact finding may be time consuming, but in the end it will be found profitable for the writer to remain in close contact with the work he is describing in order to accumulate sufficient information to prepare a rough draft for conference discussions.

The primary requisite for a safety code is detailed accuracy. It has been found advisable after completion of the rough draft, to have the code reviewed by a committee composed of personnel thoroughly familiar with the operation covered. Such a committee could be made up of foremen, members of the engineering and safety departments, and several employees experienced in work described by the code.

In reviewing the initial draft of the code, committee should exercise care in eliminating any instruction or rule that is inconsistent with the nature of the operation, or that is confusing. Achievement should not be handicapped by a multitude of mandatory rules that might antagonize employees, and there should be sufficient flexibility to allow for expansion of crew sizes and scope of operations.

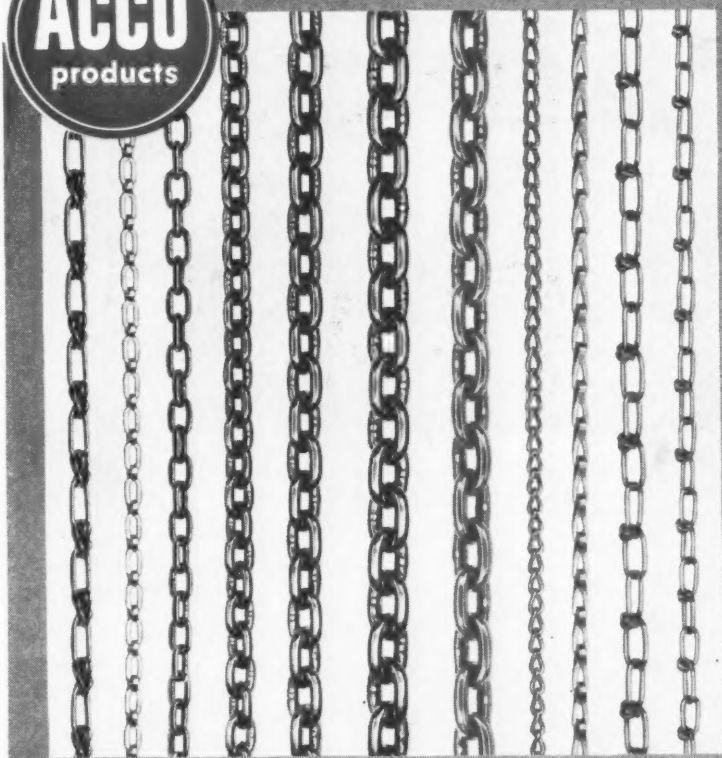
When the process of reviewing and revising have been completed to the satisfaction of all, the finished code is rewritten in final form and sent to the plant superintendent for approval before publication.

Use of the code

After the code has been published each employee should receive a copy with instructions to read and study it. It has been found desirable to call the crew together to explain the necessity of various operations, and clarify points not thoroughly understood. A new employee should receive a copy of the code and after a reasonable length of time take an examination to determine what he has learned.

In order to be effective, safety education must be a continuous process. No matter how well initial instruction may be conducted, it must be followed up regularly and systematically. One way of keeping the program alive is to hold safety code reviews from time to time, for discussing new methods or changes in practice that may have developed. A temporary revision can be handled by publication of a safety bulletin distributed to all concerned.

Safety codes have been used to good advantage where new equipment or new operations are being installed. By preliminary studies of equipment and preparation of detailed instructions for its use, the hazards usually found in such a change can often be avoided.



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• Although two chains may look alike, their end uses differ, resulting in poor service if a substitution is made. For instance, the three heavy welded chains in the middle above appear almost identical except for size. Yet one is designed for general service where great strength is not required, one is for logging, while the third is for heavy duty service.

The same thing applies to the weldless chains. Take the two stamped, flat link chains: the safety chain near the left, and the sash chain near the right side. One has only to keep something from being lost; the other must carry weight and run over a pulley. Alike in looks, yes—but that's as far as it goes.

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(Above) Air bubbles are seen rising in the ice-free mill pond as compressed air is pumped through a mile long network of pipelines.

(Below) This "steamer," a floating, 40 x 125-foot shed, is designed to thaw out logs immediately prior to their entering the sawmill. The process is three hours in duration.



BUBBLED AIR FREES MILL POND OF ICE

*Year-round operation for Idaho sawmill
due to owner's idea of clearing mill pond*

THE PROBLEM of a mill pond freezing over has long been an enigma to lumbermen. Until recently it was necessary to shut down a mill because it was impossible to transport logs frozen into the ice.

Warren H. Brown, owner-manager of Brown Tie & Lumber Co., has solved the problem for his mill on the banks of Payette Lake, Idaho. Brown made temperature tests at various depths while the lake was frozen over, and found that the water was in no case colder than 38 deg. F. at depths below 10 ft. He knew that an air bubble in the lake makes holes in the ice due to stirring up of warmer water near the bottom. Utilizing this information, Brown decided to try an air-line sunk in the pond hoping to clear away surface ice on a larger scale.

He ran two one-inch pipelines of 1,000 ft. in length and 60 ft. apart, out onto the ice. Every 60 ft. a 1/32-in. hole was drilled, and the pipes were sunk into the lake through a trench cut into the ice with power saws. Water depths ranged from 20 ft. to 100 ft. below the ice. Compressed air was hooked up and the pipe began bubbling air under the ice at 5 p. m. on the trial day.

The next morning ice had completely disappeared in an area 100 ft. by 1,000 ft. During the rest of the winter temperatures went as low as 30 deg. below zero, but the pond remained free from ice as long the water was being agitated. With the success of this venture, Brown has installed over a mile of pipeline in his pond and can thaw out any portion

of the pond by merely flipping a valve. Air for the system is provided by a 200-cu. ft. compressor operated by an electric motor located in the mill building.

Another difficulty encountered, due to winter operations, was the snow and ice packed on top of the floating log, making the log difficult to handle easily and saw accurately. Brown solved this problem by piping waste steam from the boilers down to a floating steamer shed. This steam shed, 40 ft. wide and 125 ft. long, thaws out logs before they go up onto the mill deck in an average time of three hours.

Production during the last two winters has been the equal to summer output, and the 100 employees of the mill are now able to work the year around.

DOUGLAS FIR grade loss studied

EXTENT OF GRADE LOSS in second-growth Douglas Fir lumber because of seasoning and machining will be determined by the Oregon Forest Products laboratory with industry co-operating.

Kiln-drying Douglas Fir stock has been satisfactory from the standpoint of increasing lumber value and reducing shipping weights, and some retailers prefer it since it helps them to cater to a more discriminating trade. Dried material is much less subject to yard deterioration, and consumers benefit because wood is partially pre-shrunk.

Second growth has more sapwood, adding more weight to green stock, and has sound, tight knots. Over-weight shipments may make drying more attractive to some mills now shipping green stock.

PULP SAVINGS Weyerhaeuser system report

A TOTAL saving of \$8 per ton is being realized at the Longview (Washington) mill of Weyerhaeuser Timber Co. from its magnesia-base pulp, according to F. G. Ely of Babcock & Wilcox Company.

Speaking at the American Chemical Society convention in Los Angeles in March, he said the latest operational results show that the total chemical make-up is approximately 25 pounds of magnesia and 85 pounds of sulfur per ton of air-dry pulp. As compared to calcium-base pumping, which required 270 lbs. of sulfur and 350 lbs. of limestone, these quantities at prevailing prices represent a saving of \$3.20 per ton of pulp.

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WESTERN TEXTILES hope for another industry

PROSPECTS for a Western textile industry, which have been very much of a will-o-the-wisp in the past, were dragged out and dusted off at the American Chemical Society meeting in Los Angeles last month. This time, prospects seemed more hopeful, although there is still nothing particularly tangible.

A symposium presided over by A. George Stern, Heyden Chemical Company, San Francisco, developed some highly interesting facts and ideas, among which are the following:

In view of the over-equipped situation of the country, it would be hard to interest capital. The only hope would be a mill capable of handling any kind of yarn, not just the traditional cotton, wool and linen, and thus independent of demand fluctuation.

The Bird system, which meets this need, has been installed in one Collins and Aikman mill in the South, which operated three shifts a day right through the recent textile depression.

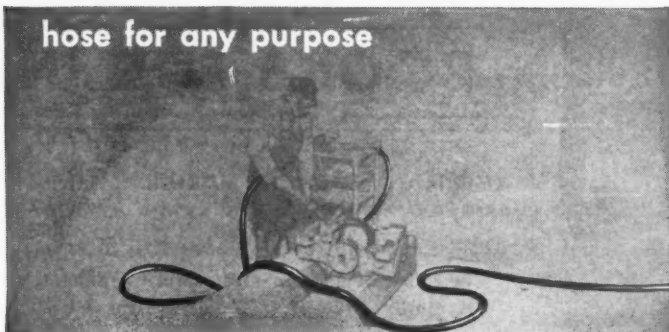
A deep impression on the style market has been made by the West in the leisure or casual clothes category, according to Graeme G. Whytlaw of the textile research department of the American Viscose Corporation, who said "With such an auspicious beginning and the forecast increase in population, eventual establishment of a West Coast textile industry is not an idle dream."

The West's best immediate hope would appear to lie in the establishment of specialized units, such as chemical fiber plants, according to Emery N. Cleaves, vice president of the Celanese Corporation, who said that a Western textile industry would grow piecemeal.

California already has a textile dyeing, bleaching, printing and finishing industry, said Frank P. Bennett of *America's Textile Reporter*, Boston. He cited the National Dyeing and Finishing Company, Culver City; yarn dyeing establishments in Inglewood; Los Angeles firms such as California Piece Dye Works, Jenkins-Wright Co., Los Angeles Piece Dye Works, Harry Schwarz Yarn Co., Standard Dyers and Finishers, Inc., Western Dye House, Yarn Dyers, Inc.; in San Francisco, the Ace Dye Works and Colorcraft Corporation.

Charles L. Hamman of Stanford Research Institute estimated the Western consumption of cotton as 9.4 per cent of the national total; of synthetic fibers, 7.6 per cent.

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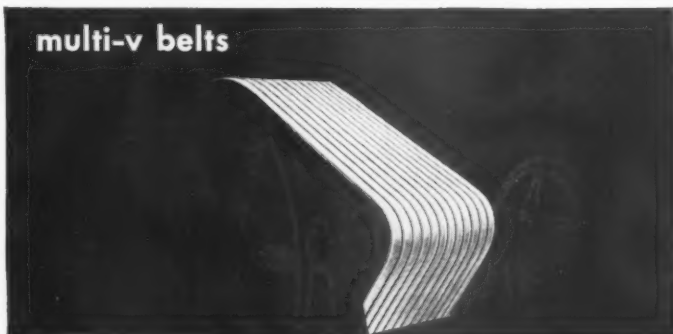
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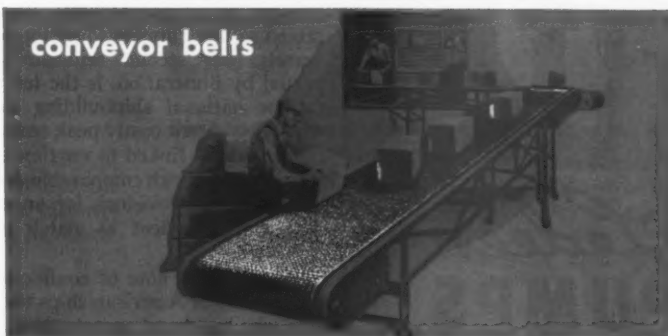
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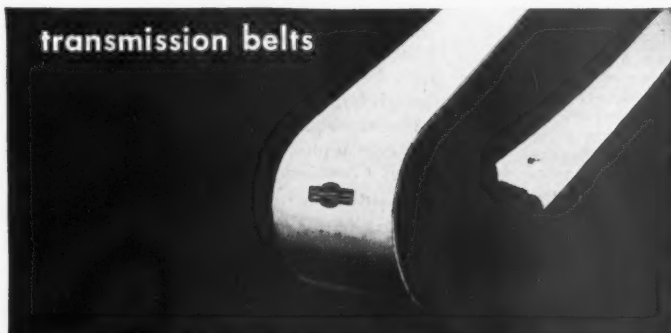
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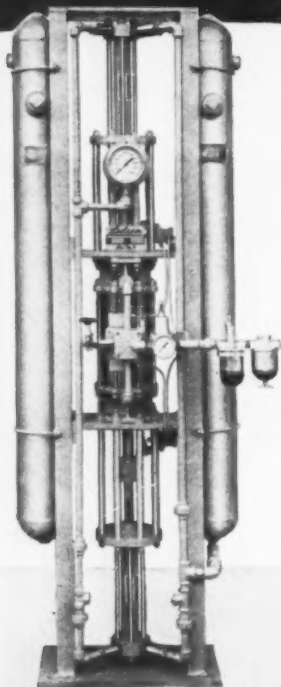
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BOOKS FOR INDUSTRY

AMERICAN MERCHANT MARINE past to present

reviewed by FRANK E. FELIZ

The story of the American Merchant Marine from its early days of sail to the present is covered in a lively, chronological record that points up the problems and accomplishments of government and industry in developing intermittent bids for leadership as a maritime power.

For readers who would prefer an informal and anecdotal log of the progress of the American flag in merchant shipping, Reese Wolfe has packed the highlights of three centuries of the Nation's coastal and high seas maritime expansion into a single volume.

Underscoring the many factual tales of ships and men at sea is the author's primary conviction that the American merchant marine lost ground due to its original reluctance to shift from its famed sailing clippers to steam-power vessels. His second criticism, supported by illustration, is the feast-or-famine national shipbuilding policy which has meant costly peak construction programs linked to wartime shipping demands, with comparable decline in peacetime provisions for an effective merchant fleet to match naval operations.

Closing on a note of confidence in the abilities of American ships and the men who build and operate them, Mr. Wolfe points to the new super-liner *United States* as an example of the Nation's capacity to achieve a merchant marine program that can effectively serve America at home and abroad, both under a peacetime or an emergency economy. "Yankee Ships" by Reese Wolfe. Published by *Bobbs-Merrill Company, Inc.*, Indianapolis-New York, 1953. 287 pages; \$3.75.

AN INTRODUCTION to linear programming

A set of techniques developed to meet practical industrial and economic problems is described in this new book by A. Charnes, W. W. Cooper and A. Henderson. First half of book introduces the theory of linear programming from the economic point of view. The last half covers mathematical theory. Working details of planning and analysis are covered at two levels—that of the individual firm as well as industry-wide and economy-wide

activity. Treated with care are such factors as market conditions, profit possibilities, capacity limits, time and production requirements, quality considerations, and balance between sales and production. Published by *John Wiley & Sons, Inc.*, 440 Fourth Ave., New York 16, N. Y. \$2.50.

COMPRESSED AIR POWER in industrial production

Here's a booklet directed to designers, engineers and production men in industrial plants to help them evaluate the usefulness of pneumatic equipment. The booklet presents concisely, but comprehensively, the many uses of compressed air in industrial production: actuation by air cylinders, agitation of liquids, blast cleaning, chipping and scaling, clamping, drilling, forging, grinding, hoisting, etc. The text is supplemented by 13 tables and 63 illustrations. Copies may be obtained for 25¢ each from the *Compressed Air and Gas Institute*, 1410 Terminal Tower, Cleveland 13, Ohio.

DETERGENTS— the "what" and "how"

Here is a book by Donald Price, Technical Director of Oakite Products, that brings detergents from the realm of specialized organic chemistry to the level of the average reader. It throws light on the manufacturing processes and important applications of detergents. Should be useful to purchasing agents and industrial users of detergents. Published by *Chemical Publishing Co.*, 212 Fifth Ave., New York 10, N. Y. \$4.00.

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New and important releases which were available at the **WESTERN METAL SHOW AT LOS ANGELES, March 23-27**

Were you one of the many Western Industry readers who were unable to attend this show, the largest of its kind ever held in the West, where many products were shown or announced for the first time? If so, Western Industry herewith provides you a round-up in abbreviated form

HELPFUL LITERATURE

for the plant operator who wants to keep informed

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Metal Show literature

1 Valuable device for the universal tool and cutter grinder

Description of device which makes it possible to grind helical surfaces without using a follower is available from *Precision Machinery Sales*, distributor of AB Thorns Mekanska Verkstad Machine Tools.

2 Effect of metal working coolant solutions on production

The *F. E. Anderson Oil Company* had available at the L. A. Metals Show their booklet describing case histories of how machine speeds and feeds can often be increased.

3 Solvent vapor degreasers

The *G. S. Blakeslee and Co.* offered a 20-page brochure on degreasers. Displayed for the first time was a solvent vapor degreaser with new type bronze alloy corrosion resistant tank coating.

4 New "DBM" Databosser displayed for first time

Dashew Business Machines, Inc., will gladly send you their answers to questions "How can we avoid waste and loss through lack of proper property identity?" and "Is there a more practical and economical method for tagging factory parts and storage items?"

5 All-purpose base cutting fluid data

Four-page brochure compares user's specifications of ideal cutting fluid with those incorporated into Antisep All-Purpose Base. Also interesting testimonials of users. Bulletin 2-528-A by *E. F. Houghton & Company*.

6 Fluorescent penetrant

Lubrication Co. of America advises: "those wishing to have detailed information as to the use of 'Fluorol #307' for flow detection are advised to get Air Force Manual, AMC 74-4 entitled 'Fluorescent Penetrant, Methods of Inspection'." However, the Lubrication Co. of America will send you literature that was available at the show.

7 A complete guide to successful silver brazing

This is the title of a pocket size 48-page booklet available from *Pacific Metals Co., Ltd.*, published by Research Division of the *American Platinum Works*.

8 48-page reference catalog

Specifications, operating tables, parts lists and prices of hoists, pullers, binders, trolleys, utility maintenance tools and other lifting and pulling equipment offered in 48-page catalog by *Coffing Hoist Company*.

9 Handbooks on radioisotopes for industry

Application of radioisotopes to industry covered in two pocket size handbooks, one 14 pages and the other 16 pages. Particular emphasis on petroleum industry and application problems in other industries make these valuable reference pieces for the product research man. *Tracerlab, Incorporated*.

10 Tool room accessories for jigs, fixtures, dies

Vlier Engineering, Inc., has a new 8-page catalog (No. 53) on spring plungers, fixture keys, spring stops, toggle pads and tom thumb screws which is still available if you didn't pick one up at the show.

11 Hydraulic controls

The *Denison Engineering Co.* has a new brochure describing their new multi-range flow controls, direct operating pressure controls and their new pilot check valves. Some exclusive features are described.

12 Motor driven hydraulic tensile testing machine

Pacific Scientific Co. made available Bulletin C.T. 1-5 describing the motor driven Cal-Tester tensile testing machine—a machine "well suited for testing both metallic and non-metallic materials in rod, strip and sheet form, and yet when chosen for production work has features which make it exceedingly easy to operate."

13 Oxygen cutting electrode and holder data

Data sheet contains recommended oxygen regulator pressures and welding machine settings for cutting and piercing stainless steel, cast iron, nickel alloys, copper and

copper base alloys. Features new Weldbest cutting electrode holder and arc oxygen cutting electrode manufactured by *Weldwire Company, Inc.*

14

A "G" clamp

Merrill Brothers showed their "G" lifting clamp designed to handle plates, slabs or billets of unusual thickness and weight, where it is necessary to rotate piece through 180 deg. for examination or operation. Descriptive literature available.

15

Contro-Therm process heat treating facts

Illustrated brochure gives applications of various Contro-Therm units with automatic combustion control plus specification tables. Bulletin available through *DoAll Western Company* by encircling appropriate number on reader service card.

16

Chrome on aluminum plating results

Electro-Chem Research Laboratories offers 4-page brochure on test results of Electro-Loy-M coating on aluminum.

17

Specifications and features of sludge filter

U. S. Hoffman Machinery Corporation offers details of applications, construction, filter medium and operation of new model sludge filter. Form A-915.

18

New electric rider straddle truck

Specifications, dimensions and features of new model Warehouse in 2,000 and 3,000 lb. capacity. 4-page booklet 1535-A from *Yale & Towne Manufacturing Co.*

19

All-purpose cutting machine data

Brochure illustrates plate and sheet working operations performed on Nibbler machine with simple tools and attachments. Specifications and capacity ratings also given. *Eric S. Johnson Company.*

20

Mohawk Subland drill-tap

Specification and data sheet on new drill-tap (2-2) with pertinent operating instructions. *Electrolizing Sales and Tools, Inc.*

21

New type Roto-head for lathe operation

One of the outstanding operating exhibits showed performance of a new type lathe head. Four-page catalog shows features, operating capacities and typical work examples. *General Roto Company* form 4577.

22

8-page catalog on portable X-ray units

Specifications, accessories and features of the new *Andrex* portable X-ray units for industrial radiography. Good stuff on increasing trend of radiographic examination of welds in finished structures. *Holger Andreasen, Inc.,* San Francisco.

23

Informative data on shot peening applications

Metal Improvement Company offers 24-page catalog showing numerous fatigue test results before and after shot peening. Includes data on new shot peening process before chrome plating, and uses after grinding, for forming, straightening and miscellaneous applications.

24

New 3-in-1 combination box angle

Leaflet gives descriptive data on new tool combining right angle iron, box parallel and the angle plate. Also leaflet on adjustable floor plates for sturdy surface assembly operations. *The Challenge Machinery Company.*

25

New tapping attachments

Well arranged 4-page brochure illustrates free axial float design incorporated in Tapmatic and Tapmaster models and the advantages it gives. Specification tables shown also. *Tapmatic Corporation.*

26

Profile tracing lathe attachment

Four-page brochure describes Pro-Tracer lathe attachment and mentions special literature available giving operational details. *U. S. Tool & Engineering Co.*

27

Free timing belt width calculator and 74-page drive manual

Durable plastic composition calculator for accurate selection of belt width. Gives clear instructions for progressive readings. Should be a "must have" for every

— ALL RECORDS BROKEN AT WESTERN METAL SHOW AND CONGRESS —

ALL RECORDS for attendance and participation for any Western show of its kind were broken at the Western Metal Exposition and Congress in Los Angeles March 23-27. In fact, the figures were reported to be very close to national shows in the same field.

So successful was it that the previous practice of alternating between Los Angeles and Oakland has been abandoned, and a lease has been signed for March 21-25, 1955 for Pan-Pacific Auditorium, with other dates reserved for 1957, 1959 and 1961.

Clocked attendance for the five-day show at Pan-Pacific totaled 53,463, while registration added up to 33,648.

There were 282 exhibit booths in the auditorium and two adjacent circus tents, and nearly 100 more participating firms, as many companies took booths jointly.

For many exhibitors it was their first appearance in the West. European and Japanese tool lines were represented, through sales agents, and one Swedish metallurgical concern had its own booth.

Western Metal Congress sessions were held concurrently at the Hotel Statler, presented by seven cooperating technical societies, and many sessions were jammed to capacity.

"The large turnout," reported William H. Eisenman of Cleveland, secre-

tary of the American Society for Metals, who managed and directed the affair, "is representative of the great recent industrial expansion in the West. New developments in metals and their fabrication find immediate application in the Western area. The speed at which advances in metal engineering were pounced upon at the show and technical sessions indicates the Western area can absorb new developments as rapidly as they come out.

"With enormous research efforts going forward in Los Angeles and San Diego, it is obvious that scientific equipment will continue finding a ready market in the Southwest and other Western sections."

industrial engineer, production and maintenance man. *New York Belting & Packing Co.* also offers free 74-page well indexed manual giving basic engineering data, selection tables and horsepower ratings for various size "Timing" belts. Really helpful information. (NY-2223) Also free price and size catalog of 16 pages.

28

All-purpose cutting machine

"Different operations made with a few simple tools and attachments" are outlined in a prospectus describing the Nibbler machine. *Montague-Harris & Co.* has the details.

29

Aluminum hard surfacing

The *Sanford Process Co.* made available a memorandum report, the object of the report being "to investigate the preparation and physical properties of subject hard surfacing."

30

New rotary sander

The *Van Arsdale Corp.* has new literature on a new unit that "combines the use of quick-change coated abrasive fillers supported by neoprene pads to provide an abrasive tool of diversified application."

31

"See how Rivnuts work"

If you didn't see how they worked at the show, the *B. F. Goodrich Co.* has some literature that will show you. Plus a data book for designers and engineers describing "the only one-piece blind rivet with threads."

32

New low-cost barrel type vapor degreaser

Complete specifications, features and price covered in data sheet. Exhibit at Metals Show drew considerable interest in this low-cost degreasing equipment. *Baron Industries of California.*

33

"Grinding was never like this!"

Buckeye Tools Corp. would have explained how with belt grinding attachments they have successfully combined the maneuverability of the portable horizontal grinder with the utility of the abrasive belt. Explanation available in brochure form.

34

New drill press

Mid-State Manufacturers, Inc., showed their new Weaver "Multi-six Spindle" drill press for the first time. Prospectus available outlining features.

35

New magnetic rotor

Heath Engineering Co. combines the advantages of a smooth contact surface with a positive adjustable friction insert in small diameter rotors.

36

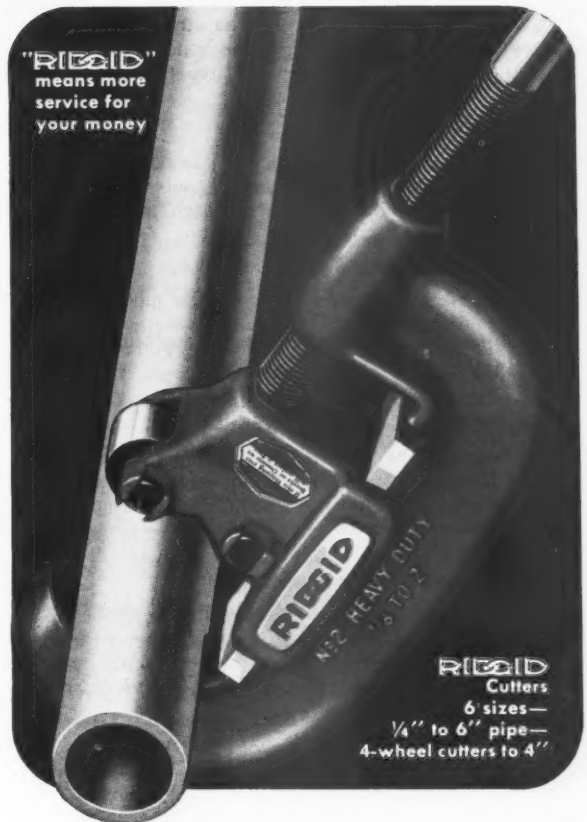
New tool for . . .

... "the simultaneous deburring, or chamfering, of both front and back faces of drilled holes in a simple, rapid, automatic operation. Manufactured by *Nobur Manufacturing Co.* New literature available.

37

Crystal model kit

A new and original device which vividly demonstrates crystal structure in three dimensions. The *Harshaw Scientific Crystal Model Kit* was developed to fill the need for a simple and effective means of visualizing through a dem-



Millions of users agree—
you cut more pipe with less work
with
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Heavy-Duty Cutters

There's a big difference in pipe cutters—and you're sure of it the first time you slap a **RIDGID** on a pipe (any kind) and see how easily cleanly it rolls through the metal. Beautifully balanced for easy action. Factory tested for perfect tracking—and guaranteed warp-proof housings of special malleable hold it. High alloy thin-blade or heavy-duty cutter wheels that leave practically no burr. You cut pipe fast with least effort. Ask your Supply House for the more-for-your-money **RIDGID**.

THE RIDGE TOOL COMPANY • ELYRIA, OHIO



onstration model, various crystalline structures. Models constructed with the kit are essentially space lattice models which also show abstract schemes of repetition.

38

Industrial filtration

Industrial Filtration Co. (Delpark) has a new bulletin of interest to you "if you have machine tools which require the use of soluble oils or cutting oils in machine operations."

39

Specifications booklet

Welding machine specifications on new models offered in 4-page brochure by *A. O. Smith Corporation, Welding Products Division*. Also welding electrodes and accessories. (WM-151)

40

12-page Cascade Cooler catalog

Detailed diagrams, charts, specifications and applications of Karbate Impervious Graphite Sectional Cascade Coolers offered by *National Carbon Company*. Good stuff. (CP-2490)

41

General purpose heat-treating data

Production and operating data, dimensions, applications and special features of the Westinghouse General Purpose Furnace, available with either gas-fired or electric heating elements. Bulletin B-5901. *Westinghouse Electric Corporation*.

42

Cold-cleaning 439 and 440 combination

Description, performance data and high economy factor of Houghto-Clean combination for cleaning of metal parts in power washers at room temperature. New process. (2-539) By *E. F. Houghton & Company*.

43

Quick change tool holders and adapters

The *Portage Double-Quick-Tool Co.* had a display at the show to help you with the problem of changing tools quickly. Catalog and brochure available.

44

New model optical dividing head

Diagrams, operating data and price list on the new Carl Zeiss Jena optical dividing head. Detailed nomenclature also given in 6-page booklet from *Ercona Corporation, Scientific Instrument Division*.

45

38-page toggle clamp catalog

Mechanical drawings, specifications, holding pressures and stock list of De-Sta-Co toggle clamps for clamping parts in production is neatly arranged in a 38-page catalog, sent free by encircling above key number on reader service card. Catalog also contains catalogued specifications and prices on shim stock, feeler stock, arbor spacers and shims for gears, bearings, etc. Good solid information. *Detroit Stamping Company*. (52)

46

16 pages on flame plating by Linde

New method of applying thin metallic coatings such as tungsten carbide on metal parts. Describes physical properties, thermal and mechanical shock resistance, application hints and potential market of prescribed uses. *Linde Air Products Company* forms F-8065-A and F-8215.

47

26-page catalog on new modern methods of joining metals

Good roundup of new methods of joining metals with suggested applications. Photographs illustrate recommended techniques. Form F-7942, *Linde Air Products Company*.

48

New automatic Heliweld hardfacing process

Details on this new process for mass production needs in wear-resistance, in data sheet from *Air Reduction Pacific Company*. Also shows equipment and process data.

49

Tandem welding with single controls

Four-page catalog introduces hidden-arc process for increasing automatic welding speeds. Shows diagrams of electrode positions for various penetrations and speeds and settings procedures for Twinarc welding. Bulletin 1328, *The Lincoln Electric Company*.

50

High frequency induction heating bulletin

Leeds & Northrup Company offer information on new Rayotube detector for accurate temperature measurement of visible work where speed of response must be fast and the available target area is small. Also specifications and application data. (10-353)

51

40-page machinists' operating manual

Excellent information on cutting-off problems, interchange of tools, tool holder charts and diagrams plus various tables and measures and guides. All in handy 40-page pocket-size handbook. *Marvic, Incorporated*.

52

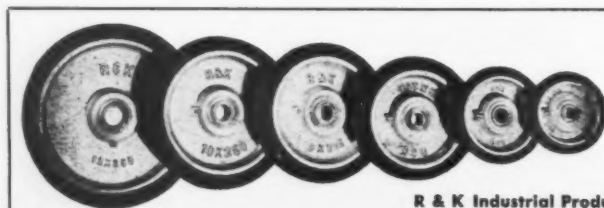
New demountable steel-based industrial wheel

Four-page brochure discusses specifications and features of new type industrial wheel whose design simplifies tire replacement. Check chart shows wheel test results followed by itemized list of applications. Form MB-52, *The Rapids-Standard Company*.

53

Comparative properties of carbon-graphite electrodes

Handy 3-fold *Arcair Company* folder gives valuable data for users of Arcair electrodes, plain carbon-graphite or copper coated and special metal electrodes. Gives comparative properties of carbon vs. graphite and plain vs. coated along with specifications and prices.



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54

Molecular bonding data

Twenty-page catalog gives factual data on Al-Fin process of molecular bonding of aluminum and its alloys to steel, iron, etc. Covers uses for heat transfer, bi-metallic assemblies, bearings and bushings, brakes and clutches, etc. Also explains factors of oxidation resistance. *National Steel & Shipbuilding Corporation.*

55

Drill press specifications

Four pages of detail features and specifications of production, floor and bench models of Walker-Turner 15-in. drill presses. Also specs and ordering numbers of accessories. Form A-2, *Walker-Turner Division, Kearney & Trecker Corporation.* Form A-3 gives details and specs on 20-in. overhead drill presses with special set-ups.

56

16-page heat exchanger catalog

Easy-to-read 2-color catalog shows fluid velocity, fluid pressure drop, specifications and numerous charts and diagrams on Karbate standard impervious graphite heat exchangers. Catalog also gives design, installation and operating information. *National Carbon Company Bulletin CP-2465.*

57

Data on new aluminum, stainless and non-ferrous metals welder

The *Lincoln Electric Company* introduced at Metals Show new Inertarc welder. Important new developments, specifications and features covered in data sheet, available free by encircling above key number on readers service card. Also points out new safety for operator.

58

High speed production tool data

Data sheets on features, specifications, capacity ratings, prices, etc., on new milling machine, radial drilling machine, vertical miller, drilling fixtures, etc., available from *de Castro & Associates.*

59

16-page catalog on heavy duty Demoor lathes

Specifications and capacity ratings given the Demoor line of heavy duty lathes in 16-page catalog. *Bell Equipment Company.*

60

Sigma welding . . . new process with promise

Six-page bulletin reports details of new process of shielded inert gas metal arc welding with operating capacities, work range and equipment needed for Sigma welding. Good informative booklet published by *Linde Air Products Company.* F-7823.

Use rip-out postcard for your free
Metal Show literature

61

Catalog on new type variable speed drive

Specifications, rating tables, features and other pertinent data featured in new 4-page catalog on completely new type variable speed drive. Important features of the new drive are its flexibility in output speed, control, mounting, shaft center distances and application. Encircle above key number for free copy. *Reeves Pulley Company.* (V-532)

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 Oakland 3, Calif.
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62

Totally enclosed gyro degreaser

Specifications and operating data provided in 4-page brochure. Drawings and tables give valuable information on application. Form F-204-1, *Detrex Corporation*.

63

Electrical industrial ovens for accurate control

Full specifications and application data on *Coates Electric Manufacturing Co.* ovens. Covers baking and drying, plastic processing, non-ferrous aging and heat treating, testing and research applications. Bulletin 211.

64

New collector ring for general purpose applications

Industrial Electrical Works offers specifications and ratings on new electrically operated general purpose collector ring for low-speed rotary contact. Also 2-page data sheet covering specs and installation suggestions on automatic take-up reels for electric cord and cable.

65

Dual speed drill press turret data

Specifications and operating data on new Select-A-Spindle dual speed drill press turret covered in 16-page catalog #851-4 by *Commander Manufacturing Co.* Also details on new finger-tip control chuck with capacity #00 to 5/16-in. taps.

66

Counter and fixture clamp data

Leaflet describes new downholding counter and fixture clamps for use on production machine tools. Specs and prices included. Also leaflet on features of "Square-per-Fect" precision grinding vise and accessories with prices. *J. & S. Tool Company, Inc.*

67

Spec sheet on new universal grinder

Illustrates the new Grindley Universal Grinder with complete standard equipment specifications. *Grindley Precision Grinder Co.*

68

Guillotine

Manco Manufacturing Co. offered catalog No. 152 describing "Manco Guillotines"—high pressure hydraulic tools offering up to 50 tons thrust in compact portable units.

69

Riser block kits

Watts Machine Works, Inc., will send literature on a new line of riser block kits to increase the swing of a number of makes of the lighter class lathes.

70

New in-plant inspection process

Shows how Met-L-Chek locates and reveals cracks in ferrous and non-ferrous metal parts. Eliminates costly wasted machining on items later rejected. *Met-L-Chek Company*.

71

How to measure metal drawability and susceptibility to stretcher strain

New Flex-tester spherometer measures and tests drawing quality and stretcher strain capacity in non-destructive testing of sheet metals. Features of meter and specifications discussed in 4-page illustrated brochure from *Steel City Testing Machines, Inc.* Form B-1.

72

Spectroscopic electrodes data

Well illustrated 4-page booklet offers blueprint descriptions and selection tables for preformed special graphite spectroscopic electrodes. Also lists technical references dealing with their use. *National Carbon Company* form CP-2485.

73

35 pages of specifications on counters

Presin Company offers free 35-page extract of IVO counter catalog showing specs and prices of hand counters, stroke counters, revolution counters, hand speed indicators, printing counters and electro-magnetic counters for remote indication.

74

Portable lifting power engineered for every lifting need

Lempco displayed their newest model Hydraulic Mobil-crane. They have a brochure with all the details.

75

8-page torch tip catalog

Illustrates tip style, size and number of preheat on each of several types of replacement tips for welding torches. *National Torch Tip Company*.

76

Transforms any machine into a versatile contour applicator

Acrolab Development Co. made available literature on their Contour Sensor—"accurate to 0.0005 and better."

77

Continuous automatic scrap removal

May-Fran Engineering, Inc., was demonstrating how you could remove scrap from operating machine tools automatically. A brochure is available.

78

Disc grinder specifications and accessories

Illustrated 4-page brochure gives details on new 20-in. Apex disc grinder and sander with reversible disc. Also the features of 16-in. model and accessory units. *Rankin Bros. Precision Machine & Tool Works*.

79

Air powered hydraulic drill unit

Delta Power Tool Div. had available a prospectus on the capacity and operational data of a "new and larger" drill unit.

1928

1953

IN ANNOUNCING ITS 25TH ANNIVERSARY

The Reliable Pattern Works and Foundry of San Jose, Calif., gratefully acknowledges the support of the many industries, great and small, that have contributed to the success of this enterprise, making it one of the leading producers of quality patterns and non-ferrous castings in the West.

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138 Stockton Avenue

San Jose, Calif.

Phone CYPRESS 2-5959



OTHER LITERATURE

80

Learn more about drill units

A 20-page booklet, from *Delta Power Tool Div., Rockwell Manufacturing Co.*, contains extensive engineering data giving comprehensive coverage of operation, capacity, available drive arrangements and power regulation for all Delta Hydraulic drill units. Besides photographs, line and schematic drawings, a special section on engineered accessories available for firm's drill units is included. AD 723

81

Illumination on luminaires

A 24-page pocket book by *Westinghouse Electric Corp.* gives you all the dope on firm's fluorescent commercial and industrial luminaires. Detailed descriptions, photographs and diagrams plus a 4-page table tell where respective types are best applied, models available. Features of each model with dimensions are also given.

82

Clutches by any other name

A new folder on Formsprag clutches (formerly known as "Morse-Formsprag") plus technical sheets, contains information on application of three standard models for three basic functions—over-running, indexing and backstopping. *Formsprag Co.*

83

Bulletins on locknuts and collars

Two new four-page bulletins, one on Flexloc self-locking nuts and one on Hallowell steel shaft collars, come from *Standard Pressed Steel Co.* Both give information in text and illustrations on product properties and applications. Sizes and metals are listed in which locknuts (thin and regular) are available. Steel collars are listed by 42 standard sizes for shafts from 3/16 in. to 3 in. in diameter.

84

How diesel works in communications

Story of diesel electric sets that play an important role in our communications system today is told in a booklet, "Power Guards For Communications." Diesel-powered generators are dealt with as standby and main power sources for all types of communications. A back cover chart lists sizes of sets along with specifications for each. *Caterpillar Tractor Co.* F-30596

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41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
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85

Hot word on cleaning tanks

Specifications, operation data and optional accessories are all included in a leaflet on Weldbilt Model-W immersion hot cleaning tanks. Information is also given on various features such as atmospheric gas torch, insulation and hinge cover. *Industrial Systems, Inc.* T-103

86

Manual cuts cutting problems

Skil Corp., manufacturer of portable electric and pneumatic tools, publishes a 24-page manual on portable power saw cutting applications. Thirty different materials are mentioned with most effective method of cutting them—portable power saw-wise. Information includes proper blade selection and cutting technique.

87

Pressure valves and controls in bulletin form

A new 12-page bulletin on *The Swartwout Co.*'s line of pressure regulating valves and pressure master controls is printed in two colors and punched to fit three-ring binders. It is profusely illustrated with photographs, cutaways and section views, dimensional and specification data. Bulletin also lists company representatives throughout United States. S-22-CA

88

Technical data on flow meters

A set of seven specification sheets, in consolidated style, covering flow meter line is published by *Minneapolis-Honeywell Regulator Co.* Specification sheets 241 and 242 cover electric evenly graduated flow meter bodies and mechanical evenly graduated flow meters respectively. Nos. 243 through 247 cover sq. root flow and liquid level meters. No. 244 includes evenly graduated electric flow meters. Construction and engineering details are covered.

89

For best ways to solve pumping problems

Geo. D. Roper Corp. offers to industry a 36-page handbook entitled "How to Solve Pumping Problems." Introduction explains and illustrates operation of rotary gear pumps. Three sample problems show computations necessary to apply these pumps on representative jobs. Balance of book is composed of helpful charts and data relating to application. In addition, a new catalog No. 953 illustrates and describes complete line of Roper rotary pumps.

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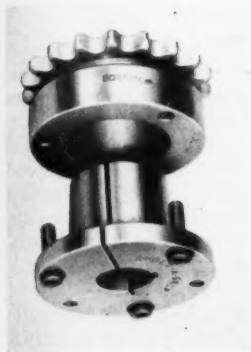
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NEW MATERIALS & EQUIPMENT

90

Interchangeable split tapered bushing designed for sprockets



Now you can stop rebor-ing stock sprockets to fit particular shafts. Shold-A-Grip bushing makes possible use of same size Boston sprockets on shafts from $\frac{1}{2}$ - to $\frac{2}{2}$ -in. diameter in steps of $\frac{1}{16}$ of an inch. Bushing is drawn into tapered hole in sprocket by tightening cap screws. It grips both sprocket and shaft with equivalent of a press fit. Product is available in sizes from $\frac{1}{2}$ -in. pitch up to and including $1\frac{1}{4}$ -in. pitch. Both bushing and sprocket are of machine steel and can be case hardened. *Boston Gear Works.*

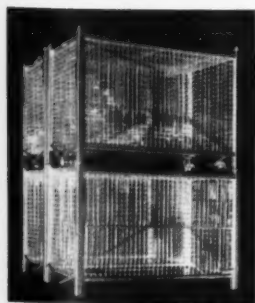
91

Right angle gear drive for vertical turbine pumps

In operating deep well pumps, this right angle gear drive permits use of gas, diesel or gasoline engine power. It is being placed in full production to 70 hp., and larger sizes are to be added. Drive is universally adaptable to any vertical pump and it includes these advantages: operator can view flow of oil from exterior; thrust bearing set in top is accessible and can be removed without disturbing hollow shaft of gears; a reverse protection clutch prevents pump shaft from becoming unscrewed in case of torque reversal. *U. S. Electrical Motors, Inc.*

92

Wire mesh stacking box is light weight and strong



Wire fabric at sides and bottom of this new box decreases weight and allows for ventilation and drainage. Wire is welded at ends and each intersection for strength and rugged shop use. Bottom frame and corner uprights are of square welded steel tube. Stacking caps of self-centering type on corner posts permit rapid and safe lift truck tiering to conserve floor space. It is available in various meshes and sizes according to load requirements. *Equipment Manufacturing, Inc.*

93

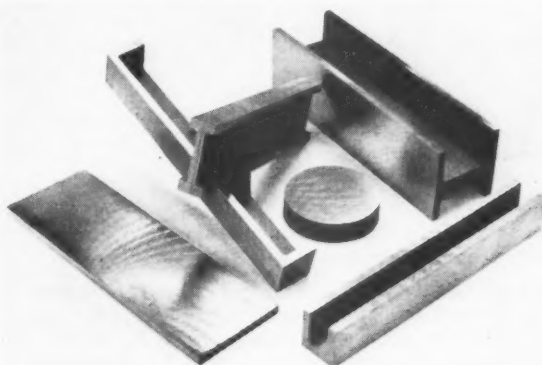
Low-cost tubing for industrial applications

Flexflyte Green Label is a new low-cost tubing intended for uses in air handling, fume removal, and in exhaust,

blowing, or gravity systems. A light weight tubing with relatively smooth bore and negligible reduction of cross-sectional area in tight bends, it has, by word of manufacturer, good resistance to oils, gases, acids, alkalis, and abrasion. Available in diameters from 1 to $2\frac{1}{2}$ -in., in $\frac{1}{2}$ -in. increments. *Flexible Tubing Corp.*

94

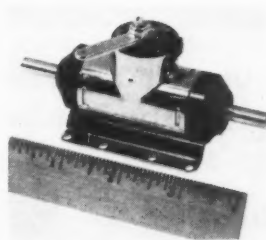
Normalized cast iron tooling standard shapes



There are now available over fifty sizes of these normalized cast iron tooling standard shapes in 18-in. lengths. Basic shapes can be used singly or as a group—come in round and rectangular flats, angle, channel, "H" and "I" sections. Shapes are finish ground on all outside surfaces, except ends, and are ground flat, parallel and square, and to close measurements. *Great Western Steel Co., Inc.*

95

Miniature variable speed changer features lever speed control



This instrument makes for easy use in speed changing applications calling for either local speed settings or remote control with connecting links, cams, cranks, or similar mechanisms. Lever speed control, with a limited lever arc of 63 deg., provides for rapid changes of speed over a 25-to-1 range. It is easily oriented independent of pointer to any horizontal position, or can be removed, giving a versatile speed control shaft in a vertical axis. *Metron Instrument Co.*

96

New plastic fabric

A new industrial fabric, with characteristics that make it potentially useful in a multitude of industrial applications, is now for sale under trade name of Fortron. Constructed of two sheets of vinyl film and a center layer of Fiberglas fabric, which are laminated together under heat and pressure to form a single sheet, Fortron is strong,

light-weight, and nonabsorbent. It is mildew and fungi-proof, acid, grease and flame resistant. It will neither stretch nor shrink and will not crack at temperatures as low as minus 30 deg. F. *Owens-Corning Fiberglas Corp.*

97

Fork truck for indoor-outdoor materials-handling



This 6,000-lb. gas-powered fork truck on pneumatic tires is designed to expedite indoor-outdoor handling operations. Open tower provides unobstructed vision for driver. Single lever for control of hoisting and tilting speeds handling. Same tire sizes front and rear simplifies stocking of spare tires. Planetary gear drive in wheels reduces wear and tear on differential and drive axles. *The Ross Carrier Co.*

98

Balancer suspends portable tools to reduce worker fatigue

Model 200-6-TB Benjamin tool balancer will suspend your portable tools weighing up to five lbs., either over or adjacent to working area. Tool is always out of the way but within easy reach—no searching for it. Automatic latching arrangement permits cable to be latched at desired

length when it is pulled out of reel. Available with or without latching attachment. *Benjamin Reel Products, Inc.*

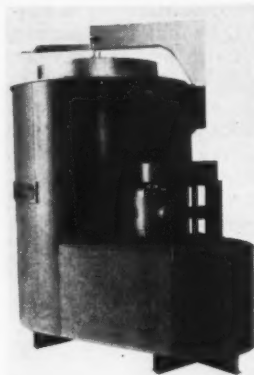
99

Light, powerful drill for heavy production work

"Mighty Midget" is a small ($\frac{1}{4}$ -in.) drill that will give you long continuous service on hard jobs. Built for heavy duty production work, this drill is light and powerful, compact, and easy to handle in close quarters. Available in six standard chuck speeds ranging from 5,000 to 600 rpm. *Stanley Electric Tools.*

100

Recirculating furnace fills needs for good heat-treating



Pacific air-draw furnaces feature three most important requirements for food heat-treating — high-speed production, quick heating and high velocity. Absolute uniformity of heat throughout large work chamber is maintained with extreme close tolerance by automatic controls. High air-velocity is assured by dynamically balanced circulating fan assembly. Firm will design your new equipment or service your old. *Pacific Scientific Co.*



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101

Trailer built for heavy duty

Built throughout with high strength alloy steel, Model R4TL alloy steel trailer weighs less than 8,000 lbs., yet has a payload capacity of 27 tons. It is primarily designed to haul equipment in Caterpillar D8 weight class and still remain within legal axle load limits in most states. Trailer has an 8 by 13-in. platform with an overall length of 27 ft., 7 in. from kingpin to extreme rear. It features a full oscillating assembly mounted on Neoprene for silent trouble-free operation with no moving parts to wear out and no lubrication required. *Martin Machine Co.*

102

New line of sprockets and roller chain

Taper-Lock sprockets and Dodge roller chain will be available from distributor's stocks. One chief advantage of these products is that they bring a new "off-the-shelf" availability to roller chain drives. Since they will come in a range of sizes for majority of industrial applications, costly reboring of sprockets to fit shafts will be eliminated. *Dodge Manufacturing Corp.*

103

"Humdinger" of a pump is now on market

Here is a new line of Humdinger self-priming centrifugal pumps with only components within volute case being impeller and seal. Every other possible wearing part contributing to hydraulic and mechanical losses common to pumps of this type is excluded. Efficient volute design makes possible greater capacity, faster priming and more trash handling ability. *Ralph B. Carter Co.*

104

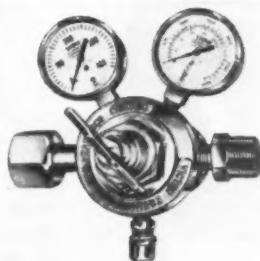
New silicone rubber is flexible at minus 120 deg. F.

SE-550 silicone rubber is believed to have lowest change in bending modulus of any commercially available elastomer. It shows less than 25 points durometer increase from 500 deg. F. down to minus 120 deg. F. Brittle point is well

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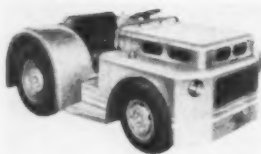
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below minus 120 deg. F. This medium-durometer rubber will have wide application for gaskets, and seals on fuselage equipment of high-flying aircraft as well as for wire insulation on ignition systems of arctic ground equipment. *General Electric Co.*

105

Heavy towing tractor for heavy industry



A new towing tractor, Clarktor-120, is designed to meet requirements of aircraft manufacturers, commercial airlines, and heavy industry. Tractor has a drawbar full rating of 12,000 lbs., and is powered by a 16A Chrysler engine. It features fluid coupling, exclusive Clark axle design and low silhouette. Together with fluid coupling, engine provides greater horsepower at low engine speed—less wear and longer life for power unit. *Clark Equipment Co.*

106

Gasket type seating permits greater adaptability in welding torch mixer

A new welding torch mixer, using "Gas-tite" servene seating rings, allows mixer to be attached to torch handle without using a wrench. Mixer fits standard Torchweld

handle. Apparatus will be welcomed by those who must frequently change operations from welding to cutting while using the same torch handle for both operations. Leak-proof connections, longer life for mixer and attachment and lower maintenance costs are other advantages claimed for seating. *National Cylinder Gas Co.*

Use rip-out postcard for more information

107

Mass spectrometer tailored to chemical industry needs



Consolidated Model 21-610 mass spectrometer is a precision electronic instrument designed primarily to monitor and control processes of chemical manufacturing and refining. Additional versatility enables it to serve as a sensitive leak detector or an analytical mass spectrometer. Direct, individual measurement of any constituent within range of instrument is said to be accurately, almost immediately obtained. *Consolidated Engineering Corp.*

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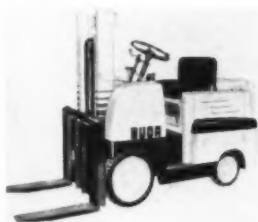
Pacific Telephone

Low cost labels with pressure sensitive tape



This new Pee-Cee printed self-adhesive (Scotch brand) tape is said to consistently cut costs up to 50 per cent over other methods where labeling and marking procedures present a manpower and cost problem. Product comes in $\frac{1}{8}$ -in. to 6-in. widths and 24-in. length, printed in three colors. Uses include point of sale ads, premium tear-offs, and combination packaging. *Cellophane Tape Co.*

New fork lift trucks by Buda



Two 5,000-lb. capacity additions are made to Buda Co. line: FTD50-24 diesel-powered and FT50-24 gasoline-powered fork lift trucks. These trucks have a "wide open" type design in which all side panels, rear and top, can be easily removed for quick accessibility to all parts. They are provided with a 12-in. diameter industrial type clutch that can be changed in approximately 30 minutes. Overall length (less forks) of these trucks is 88 in., with a wheel base of 50 in. Width of truck is 42 in. *The Buda Co.*

Plastic replaces brass in automatic valve

First example of a complex, multi-functional control device to utilize plastic is an automatic valve replacing brass control mechanism formerly used on Lindsay Co.'s water softeners. Except for a few metal components, entire mechanism is produced in "Kralastic" plastic, a tough rubbery material that combines unusual tensile strength with high shock resistance. Features of device include automatic by-pass for hard water, automatic rinse rate flow and back wash adjustment—improvements on previous brass unit. *Lindsay Co.*

Six-cylinder engine runs on either gasoline or butane

New, high-powered engine, Model 1091, for trucks and industrial uses can be converted from gasoline to butane with only slight modifications. Cylinders have a bore of $5\frac{3}{4}$ in., with a 7-in. stroke. Powered with gasoline, engine

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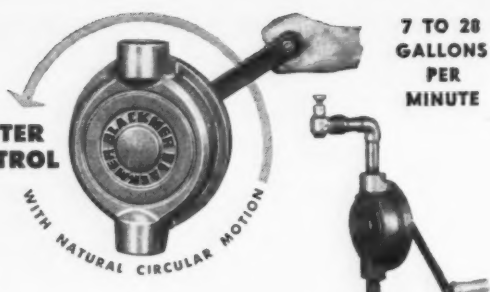
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is rated at 285 brake hp. at 2,200 revolutions per minute for truck service. Butane-powered version develops a rated brake hp. of 320 at 2,200 revolutions per minute. *Hall-Scott Motor division of ACF-Brill Motors Co.*

112

Improved hand truck for rough usage



A hand truck, combining extra lightness with heavy load capacity and husky, long-lasting construction is now available. Truck's framework is made of alloy aluminum tubing which, while weighing less than steel has greater yield strength—also resists twisting in any direction. With rated capacity of 500 lbs., Model P is a single-handle, solid blade hand truck weighing 18½ lbs. Trucks are made in seven models. *Honeyman Manufacturing Co.*

113

Low-cost electronic counter is dependable and efficient



Model 522B is a new all-purpose precision counter providing frequency, period and time interval measurements over a broad range. It is completely contained in a small, bench size unit—no extra cost modifications required to perform all functions. Results are displayed automatically in direct-reading forms, complete even to illuminated decimal point. *Hewlett-Packard Co.*

114

Fork truck stabilizer for safer loads



A hydraulic-powered load stabilizer, an attachment for Elwell-Parker fork trucks with capacities up to 6,000 lbs., is designed for safe transportation of unstable and semi-stable loads. It is also handy for stable loads subject to rough travel, and allows operator to stack at great heights with maximum safety. *Elwell-Parker Electric Co.*

M-H ramp is adaptable and safe

Made of light-weight magnesium and equipped with full-range positive locking device, this Penco flared car loading ramp is easily transported by one man, placed in position and removed. Made of heavy duty Diamond safety plate, it is claimed absolutely non-skidding, is crowned for different levels and has beveled edges to afford "no-jar" activity of materials handling equipment. *Penco Engineering Co.*

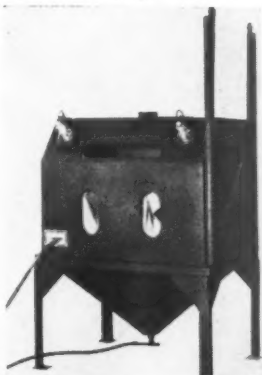
Versatile surface grinder cuts down figuring time

DoAll's D6-1 surface grinder allows you to grind directly to handwheel calibrations on very heavy cuts without removing work for measurement except at start and finish. Slip rings permit handwheels to be zeroed after an initial cut and measurement check so that direct reading of calibrations is obtained—no mathematics necessary. Machine also carries a system by which user has finger-tip control

in selecting one of three coolant methods—cool grinding, flood grinding, or a combination of both. *The DoAll Co.*

Resin pre-treatment of metal inhibits rust

A new and economical metal pre-treatment prior to painting movable steel office, laboratory and industrial partitions is based on Vinylite resins that resist corrosion, and improve durability and adhesion of finish coats. Excellent adhesion for almost all types of baking enamels and primer surfacers results in less chipping or scratching of finished product in place or in transit. Easy to apply, a thin film of wash primer is provided at a fraction that other primary coats cost. *Bakelite Company.*

Abrasive blast cleaning with no clean-up problems

By operating on suction feed principle, Belmont blast cabinets can be priced well within reach of small shop users. Clean-up time is shortened because abrasive and cleanings are confined within cabinet. Features are a trigger-operated pistol grip blast gun and long-life tungsten carbide blast nozzle. Either hard or soft abrasives may be used. *Vacu-Blast Co.*

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V-Belt and sheaves operate with engineered efficiency. Give maximum service with minimum stretch. Resilience maintained. Sheaves carefully balanced and accurately machined to minimize belt wear.

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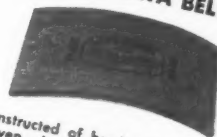
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By Wm. E. BARNETT, Chief Field Engineer

VIKING PUMP COMPANY, Cedar Falls, Iowa

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Bulletin TS-3 A

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119

Coupling features instant joining or breaking



Slide seal coupling, according to firm, permits instant connection and disconnection of fluid-carrying lines by means of a simple push-pull action similar to that used when inserting and removing a plug from an electrical outlet. Coupling is lightweight, compact and inexpensive. It may be used with a wide range of fluids. *Aeroquip Corp.*

120

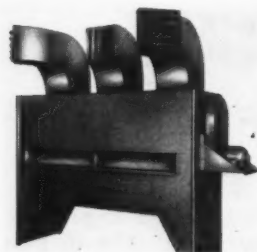
Bag flattener saves space up to 30 per cent



This power-driven bag flattener saves space, reduces damage in transit, increases pallet loads, and forms lean, neat bags that are easy to handle. Machine is portable, can be placed by packers or at end of conveyor. It measures 3½ ft. wide by 9½ ft. long. It is now used by industries such as dehydrated alfalfa, flour, talc, meat packers, etc. *Power-Curve Conveyor Co.*

121

Industrial heating on a big scale



Westinghouse now puts out an improved line of industrial heaters which deliver large volumes of heated air for large areas difficult to heat by more conventional methods. These self-contained units, ranging from 100,000 to 2,500,000 Btu. per hour in heating capacity and from 2,000 to 25,000 cfm. in air velocity, may be floor, wall, or ceiling mounted. *Westinghouse Electric Corp.*

122

Fast steam-jet cleaner

"Standard" Speedyelectric steam-jet cleaner means fast steam-jet cleaning indoors with safety from fire hazards and from flooding working area. Featuring compact portability, fast action and operating simplicity, this cleaning unit is available for operation on 220, 440, or 550 volts AC power. Operation, regulation or detergent flow and atomization with steam at jet are all under fingertip control. *Livingstone Engineering Co.*

123

On-machine sharpening with new hand hone

A hand hone especially developed for on-machine sharpening of single-point tungsten carbide tools makes possible manufacturer's claim of up to 30% longer "between grinds" when tool is "touched up" at first signs of dullness. Hone

quickly touches up tool while mounted on machine, thus cutting down time formerly needed to remove tool and regrind. When tool eventually loses original cutting angle, manufacturer recommends a complete regrinding with a Chicago XL brand grinding wheel. *Chicago Wheel & Manufacturing Co.*

124

Come snow, mud and rough terrain, this loader will pull through



Claimed highly effective for materials handling work in snow, mud, etc., Baker-Lull universal loader combines a tilting tower with 10 handling attachments to service a wide range of industrial requirements. Featured tilting tower design gives operator two advantages: in forward-tilt position, more efficiency is gained in digging and dumping; in backward-tilt position, capacity load is effectively balanced and spillage eliminated. *Baker-Lull Manufacturing Co.*

125

New alloy resists corrosion

Hastelloy alloy F is a new nickel, molybdenum, chromium, iron alloy that will withstand corrosive effects of oxidizing and reducing acids. It is claimed to handle both acid and alkaline solutions, will resist pitting and stress-corrosion cracking in chloride solutions, and has good hot-working characteristics. *Haynes Stellite Co.*

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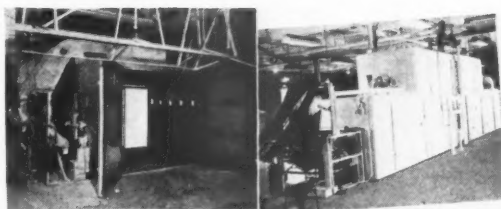
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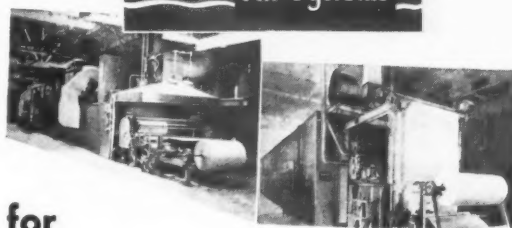
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FIG. 1402
Heavy duty bar handle
platform truck

FIG. 1001-X
"Auto-Load" Barrel Truck

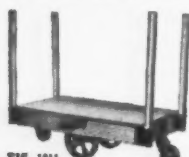


FIG. 1011
Balance-type platform
stake truck



FIG. 1112 DPL
Light weight 2-wheel
utility truck



FIG. 16
Western Pattern
with Steam Bent Handles



FIG. 219
Golden Gate Pattern

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126

"Banding helper" conveyor

A new banding helper conveyor features easy passage of banding tape through under-pass, and up a vertical deflector channel, and a channeled midrib to receive lengthwise band from a separate roll placed under conveyor. It is available for any standard conveyor widths or can be made in length and width to suit your maximum container size. Metzgar Co.

127

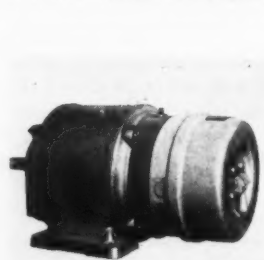
Tire warehousing simplified with fork lift truck accessory



Hi duty swing forks, exclusive attachment for Hi Duty 300 fork lift truck, is particularly adaptable for tire warehousing where both palletized and unpalletized handling is necessary. Hydraulically actuated forks can handle tire sizes 9.00 by 20 and up. Transitier Truck Co.

128

New magnetic brakes designed for fractional horsepower



Fractional horsepower Dings magnetic brakes for all standard AC or DC electric motors are now available with torque ratings of 1½, 3, and 5-lbs. ft. Units have thermal ratings of 6, 7, and 8 hp. seconds per min. Molded asbestos friction discs with high heat dissipation keep operation cool. Design eliminates solenoids and mechanical linkages. Dings Brakes, Inc.

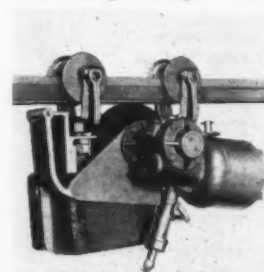
129

New improved electrode

Murex Type R electrode (grade E-6010) has proven itself on such applications as power piping, barge and tug boat construction, oil pipe lines, etc. Features are said to include: small amount of spatter, uniformity of arc behavior, lack of spearing, and ability to take high currents without coating breakdown or change of performance as electrode is consumed. Metal and Thermit Corp.

130

Light duty Monotractor offers direct, right-angle motor drive



This monotractor is built for propulsion of ordinary loads on standard MonoRail track not exceeding 1-ton capacity. It has direct, right-angle motor drive through a 2½ x 8-in. rubber wheel which is adjustably spring loaded against bottom of track. Fabricated mounting frame, by its hinged construction, permits easy access for replacement. American MonoRail Co.

131

Spray-on and wipe-off with this cleaner



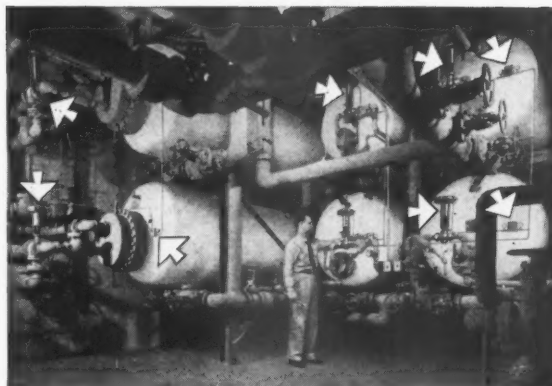
Applied by a hand-sized pressure spray gun, Spray White is a new industrial cleaner for removing grease, oil, wax, ink, cutting soap, etc. Rapid cleaning, by spraying-on and wiping-off, is accomplished without heat, odor, fumes, solvents, fire-hazard or danger to skin. Hard rubbing seldom required. *Kelite Products, Inc.*

132

Inspections simplified with new black light lamp



Mineralight is a new, high-intensity, long wave ultra-violet hand lamp designed as a portable black light inspection lamp in scientific laboratories, and for industrial and agricultural inspection. Operating on 110-volt AC current, it throws a powerful directional beam of long wave (3,660 a. u.) ultra-violet up to 30 ft. away. *Ultra-Violet Products, Inc.*



Water Heaters Controlled by Powers Accritem Regulators

What's Your Water Temperature Control Problem?

POWERS ... with their many types of thermostatic regulators and 60 years experience is well qualified to help you find the right type of control for these applications:

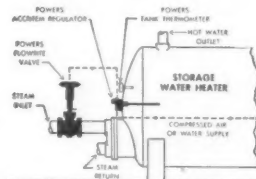
Forced Hot Water Heating Systems; various types of Water Heaters and Heat Exchangers; Jacket Water Cooling for Air Compressors, Diesel and Gas Engines also Cyclotrons, Chocolate Enrobers and Plastic forming Presses; all types of Shower Baths and Hospital Hydrotherapy; processing X-Ray, Regular and Colored Film — and hundreds of other uses.

Only one of Powers varied line of water temperature controls is shown here... the *Accritem Regulator*. It's compressed air operated, has calibrated dial temperature adjustment, adjustable sensitivity and many other features described in *Condensed Catalog 3035*.

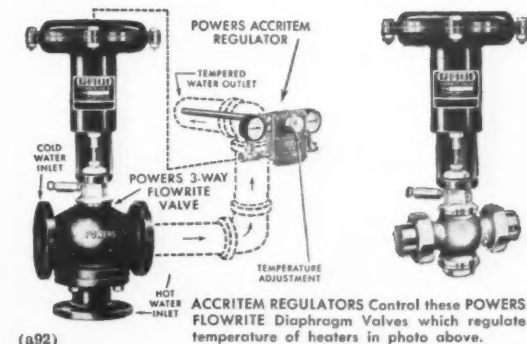
Compressed Air Operated



Only one of many applications
Small Size.
Bulb is 12" long



Powers Accritem Regulators Give Years Of Dependable Service



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Heat . . . cold . . . tank settling—all made rigid pipe on oil storage tanks move, bend and break. Then Penflex "Flexineering" solved the problem. Pipe breakage was eliminated with a length of 12" I.D. four-wall interlocked, specially packed Penflex tubing . . . installed with tight-packed flanges. Now any amount of thermal expansion or tank settling can occur with no leaks, breaks or spillage.

Penflex tubing is tight as a pipe . . . yet flexible under all conditions. Let Penflex engineers help solve your tubing problems. Penflex manufactures a complete line of four-wall interlocked and seamless welded corrugated flexible tubing . . . metallic hose and couplings from 1/2" I.D. and up. Write for folder "Flexineering"—solve your tubing questions.

Pennsylvania Flexible Metallic Tubing Co., Inc.,
7201 Powers Lane, Phila. 42, Pa.

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- To fill or get a good job?
- To advertise an auction?
- To offer or obtain some special service?

For rates see Page 165

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133

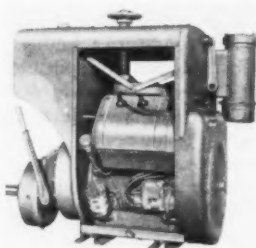
"Outboard" bearings assure longer life for weighing-in



Main lever bearings are located outside weighing platform area on Detecto all-steel dormant platform scale. Outboard bearing construction is significant in that load is applied within lever system on a full-floating platform at all times. There is no platform tipping when loads are moved on and off, and, as a consequence, excessive wear on pivots and bearings is avoided. *Detecto Scales Inc.*

134

Light-weight, compact engine supplies extra power



Recent addition to Wisconsin heavy-duty air-cooled engine line is new Model VG4D 4-cycle V-type 4-cylinder engine, developing a peak rating of 36 hp. at 2,200 rpm. Its light weight and compact design simplify engine installation on equipment where weight and space limitations are important factors. *Wisconsin Motor Corp.*

135

"A" frame dragline truck built for hard service



A rugged truck with one-piece, arc-welded steel frame—made without bolts or rivets for permanent stability—this truck is built for hard, uninterrupted service. "A" frame design is rigid in itself and takes any extra shock or abuse. L-S caster alignment and hanger mounting of main wheels prevents truck's weaving in dragline operation. *Lewis-Shepard.*

136

Hydraulic jet cleaning with low-pressure steam facilities

Sellers Booster Jet is designed to operate on ordinary cold water and plant steam of from 5 psi. to 25 psi. With this device, it is possible to convert 5 psi. inlet steam pressure to 100 psi. discharge pressure. Increase ranges proportionately to 200 psi. discharge pressure resulting from 25 psi. inlet steam. Length of jet is manually controlled to extend as far as 30 ft. from discharge nozzle. *Sellers Injector Corp.*

137

Improved magnetic drum cleans up conveying systems

Eriez magnetic drum separators now remove ferrous contamination automatically from materials conveyed in

spouts, chutes, etc. with increased operational efficiency. Improvements making this possible include: changeable sheave sizes for various operating speeds; stainless steel shells that resist pitting and corrosion; dust-tight construction; light-weight, rigid, cast aluminum sides; adjustable feeder assemblies; smooth running and oil-sealed bearings, and extended discharge ducts. *Eriez Manufacturing Co.*

Use rip-out postcard for more information

138

Inexpensive deluxe cab increases operator comfort



A deluxe cab is now available for use with Huskie and Super Huskie tractors that increases operator comfort and that carries a price lower than most other cabs. Cab's 12-gauge, all steel body can be supplied to customers with or without removable side doors and rear panel. Excellent operator visibility is obtained with a one-piece shatterproof windshield glass. *Mercury Manufacturing Co.*

139

The latest in gate valves



Edwards bellows gate valve is designed to give certified tight shut-off under all pressure conditions. Gate of valve is a metallic bellows—expansion or contraction is uniformly controlled by fluid pressure within the gate. Final seating is performed with ease and simplicity. Valves are custom made in sizes 4 in. and larger with flanged or welding ends to suit individual requirement. *S. H. Edwards, Inc.*

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ANTI-FRICTION COMPOUND
(IN WHITE POWDERED FORM)



Packed in 5-10-25 lb. containers.

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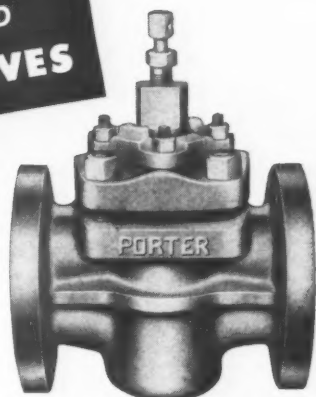
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dimensions, list prices
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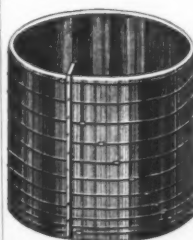
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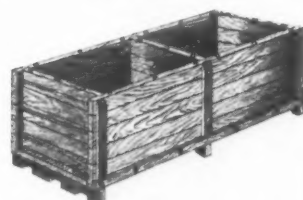
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Canneries	Soap Makers
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PLYWOOD the cinderella industry

ARTHUR HOOD, editor of *American Lumberman*, terms the plywood industry the "cinderella industry that married the profit prince," in a recent talk before Malarkey Marketing Council, a group composed of independent jobbers, trade association and publication members and M and M Wood Working Co.'s sales and advertising executives. His thoughts were directed toward producing a "permanent romance" in that wedding.

He stated that in a buyers market sales and profits need not suffer if necessary action is taken to step up creative sales development, promotion and advertising. The industry knows how to work its way out of a depression but not out of a boom. Four things necessary for creative selling of plywood in a consumer market are: need; want; ability and willingness to buy.

Marketing management will become "the most important management," more so than production management, the basic problem being to sustain the velocity, impetus and momentum of sales and profits. Unrealized potentials which will help sustain this include the remodeling, maintenance, and improvement market, and the farm market. These two have scarcely been touched as far as creative selling exploitation is concerned.

SPRAY PAINTING **SCHOOL—Los Angeles,** **July and August**

THE BINKS Manufacturing Company of Chicago will hold its first West Coast Spray Painting School in Los Angeles in July and August. Classes will be conducted at the Los Angeles plant, 4915 Pacific Blvd. There will be four one-week sessions as follows:

July 6 through July 10, 1953
 July 13 through July 17, 1953
 July 27 through July 31, 1953
 August 3 through August 7, 1953

This school is especially suitable for training officials, painters, foremen, industrial distributors and jobbers' representatives, and all those who service spray painting equipment. Classes are composed of men with similar interests and similar problems involving spray finishing and coating.

William Beacham, director of the Binks Research Laboratory, is in charge of the classes. No tuition is charged, but classes will be limited to 25 students. Send requests for enrollment two or four weeks in advance of class dates to J. E. Roche, Binks Mfg. Co., 4915 Pacific Blvd., Los Angeles.

WESTERNERS AT WORK

Arizona

Arizona Public Service Co. re-groups all company service operations into three divisions—Phoenix, Northern and Southern. LEE POE is Southern division manager, BILL REILLY is vice president in charge of Phoenix division with HERB IDLE, former Yuma manager, as his assistant, and TED FAHLEN is vice president in charge of Northern division. L. R. KIMMICH, formerly Winslow district manager, takes over same post in Yuma.

California

WILLIAM L. ALDRICH selected assistant manager of industrial relations at *Northrop Aircraft, Inc.'s* Anaheim division. DR. WILLIAM F. BALLHAUS is appointed Northrop's chief engineer. JOHN K. NORTHRUP, retired from presidency of Northrop Aircraft, Inc., is now retained on a part time basis as a consultant to president of *The Garrett Corp.*, Los Angeles. CURTIS L. BATES, recently director of mechanical design at Northrop, joins *Ryan Aeronautical Co.* as assistant director of engineering.

Van Camp Sea Food Co., Inc., Terminal Island, Calif., makes following new appointments: general manager of reorganized laboratories division, MALCOLM J. GOLDIE; nutritional adviser, DR. E. GEIGER; sales manager, JACK J. SCHROEDER; production manager, JOHN E. FUGATT.

Standard Oil Co. of Calif. consolidates activities of its former producing and natural gasoline departments into a single new producing department. Management will be as follows: H. J. MAXWELL, assistant general manager (gasoline plant operations); G. C. McLAREN, general superintendent, gasoline plant operations, Southern district; H. V. COWGER, general superintendent, gasoline plant operations, Taft area; G. L. ROSS, general superintendent, gasoline plant operations, Kettleman-Coalinga area; H. C. FASHBAUGH, assistant manager, accounting division; R. R. AUCHMUTY, assistant maintenance superintendent, Taft area; F. L. BOWEN, superintendent, gasoline plant operations, Kettleman-Coalinga area; R. F. CHILDS, chief process engineer, natural gasoline division; K. EICHLER, assistant maintenance superintendent, Kettleman-Coalinga area; E. E. GIALDINI, senior engineer; C. B. HEARTWELL, superintendent, gasoline plant operations, Southern district; D. B. JOHNS, technical supervisor, natural gasoline division; G. C. KUHN, assistant maintenance superintendent, Southern district; R. S. RIDGWAY, mechanical supervisor; L. H. VANE, senior contract man; W. H. WHIMPEY, superintendent, gasoline plant operations, Taft area.

W. A. GALE, director of research of *American Potash & Chemical Corp.*, is named head of executive staff at new research and development laboratory being constructed at Whittier, Calif. JULIEN PHILLIPS is appointed associate director of research and will be responsible for operation and administration of laboratory at Trona.

PAUL FORSYTHE, supervisor of design and application engineering at *Western Gear Works'* Seattle plant, and JOHN MORRIS,

supervisor of design engineering at firm's Lynwood plant, are promoted to staff engineer positions. CHARLES F. BANNAN, vice president of Western Gear Works, completes his assignment in Washington, D. C., with National Production Authority and returns to West Coast to resume duties on company's executive staff. S. L. CRAWSHAW, formerly assistant to president, is retiring from company.

WALTER J. KALLMEYER is new chief engineer of *Standard Steel Corp.*, Los Angeles.

Reynolds Metals Co. names WILLIAM P. LILJESTROM as chemical specialist for firm's Pacific Coast region, with headquarters in Los Angeles. He was formerly employed by *Filtrol Corp.*, Los Angeles.

T. J. VENATOR is named supervisor of aviation activities in Los Angeles for *Westinghouse Electric Corp.* He was formerly Pacific Coast engineering representative of company's aviation gas turbine division.

JOHN E. MATTOS, *United States Steel Corp.'s* resident technical field representative at Stockton, is promoted to position of manager, heavy product sales, *Columbia-Geneva Steel division*, U. S. Steel.

DR. BERNARD P. PLANNER, metallurgical engineer and staff consultant for James H.

Knapp Co., Inc., industrial furnace engineers, now is engaged in compiling results of a survey he just made for his firm in Western Germany where he recently studied post-war achievements and trends in German metallurgical industry.

M. E. SPICER is named special assistant to manager of San Diego division of *Consolidated Vultee Aircraft Corp.* He will head up a new department which will coordinate community and public relations for division.



M. E. Spicer



A. T. Cape

Superweld Corp., Los Angeles, inaugurates a metallurgical engineering and research department under supervision of A. T. CAPE, recently appointed vice president, engineering.

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TYPE SM

THESE Industrial Gearmotors are built to stand up under all conditions. Here's why—quality construction throughout, finest alloys for gears and pinions, accurate alignment, heavy-series ball bearings, rigid cast iron frames and precision production.

A. O. Smith Gearmotors are offered in twenty-one standard speeds ranging from 780 RPM down to 13.5 RPM and in ratings from 1 HP to 50 HP. Standard AGMA Classes I, II and III. Special output speeds and mounting arrangements available on request.



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Offices—Stock Exchange Bldg., 155 Sansome St., San Francisco 4; White Bldg., 1338 Fourth Ave., Seattle 1; P. O. Box 1721, Boise; 930 17th St., Rm. 501, Denver 2.

RAYMOND A. YOUNG is appointed staff engineer at *Hiller Helicopters*, Palo Alto.

RONALD D. GIBBS, vice president in charge of transportation and distribution for *Union Oil Co. of California*, is retiring.

J. N. RAUEN is appointed manager of *United States Spring & Bumper Company's* service division, Los Angeles.

WALTER L. MORE, former assistant general manager of *Santa Fe Railway* at Los Angeles, is named assistant vice president.

F. W. KAVANAGH is appointed manager of *Petroleum Products Research*, development and technical services division at Richmond laboratories of *California Research Corp.*

JOSEPH K. KANE is promoted to newly-created position of assistant to the president of *Rosenberg Bros. & Co.*, San Francisco. DWIGHT K. GRADY resigns as vice president to take newly-created position of paid chairman of board of *Fig Institute* at Fresno.

JAMES N. LANDIS, chief engineer of power division, *Bechtel Corp.*, San Francisco, is elected vice president. R. A. BOWMAN, chief mechanical engineer of power division, is named manager of engineering for that division.

ROBERT J. RORDEN is appointed chief engineer for *Gertsch Products, Inc.*, Los Angeles.

AL RORISON becomes division comptroller for *LearCal* division of *Lear, Inc.*, Los Angeles.

CHARLES P. PALIN is named manager of transportation and properties for *Pacific*

Intermountain Express, Oakland. He replaces A. L. SPRINGER, resigning.

W. W. REICHENBACH is appointed manager of oil supply and exchange department of *General Petroleum Corp.*, Los Angeles.

DR. CARL H. BECKER, German physicist and audio engineer, joins staff of *Ampex Electric Corp.*, Redwood City.



Dr. C. H. Becker



H. R. Lobdell

H. R. LOBDELL, packaging engineer, is elected vice president in charge of production and field service, *Machinery Manufacturing Co., Inc.*

LEONARD BROOKS, formerly superintendent of *Cannon Electric Co.'s* Canadian factory, is appointed factory manager of firm's Los Angeles plant.

Pastushin Aviation Corp., Los Angeles, appoints JOE HORTON, superintendent, location No. 3 plant, Hawthorne, Calif. He was formerly general manager of Air Transport Command division, *Aviation Maintenance*

SCHROCK MOTORIZED HEAD PULLEY For Belt Conveyors and Bucket Elevators



"PULLEY WITH THE DRIVE INSIDE"
Safe, compact, simple . . . no chains, no belts, no sprockets, no exposed motors.

Built by YUBA for sale in Arizona, California, Idaho, Montana, Nevada, New Mexico, Oregon, Texas, Utah, Washington.

Built and sold in other states by Iowa Manufacturing Company, Cedar Rapids, Iowa.

Pulley shell of this revolutionary head pulley rotates around electric motor and reduction gears, which are held stationary by torque arm attached to conveyor frame. Quickly in-

stalled—requires no more room than idler pulley. All moving parts protected against weather, grit, dirt. Diameters 16" to 48". 5 to 75 hp. for voltages to 2300. Job proved.

Write TODAY for folder and name of nearest distributor.



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Benicia, Calif.

Corp., Van Nuys, Calif. HERB TRAUTMANN joins Postushin as research and development engineer.

HENRY GILBERTSON, Los Angeles office manager of *Consolidated Freightways*, is named freight operations manager by firm. JOHN MILLER is advanced from position of chief clerk, Los Angeles, to that of claims manager.

CARL SNYDER is appointed manufacturing superintendent of *Magna Mill Products*, milling precision machine shop in South Gate.

CYRUS A. POOLE, consulting engineer in field of guided missile and wind tunnel design, is engaged as chief engineer for *James-Pond-Clark* of Pasadena, Calif.

JAMES J. HALLORAN, previously chief engineer, becomes partner in *Electro Engineering Works*, Oakland, manufacturer of special transformers for electronic and industrial customers.

HARVARD C. WAKEN is elected treasurer of *Bardwell & McAlister, Inc.*, electronic and lighting firm in Burbank, Calif.

Rosenberg Bros. & Co. appoints ERIK VOSS from assistant purchasing agent to purchasing agent with offices in San Francisco.

CLARENCE E. MILLER retires as president of *A. Schilling & Co.* division of *McCormick & Co., Inc.*, San Francisco. JOHN D. MILLER, Schilling executive vice president, takes over as general manager, and general sales manager will be ROBERT C. CRAMPTON.

A. R. BOOKER, president of *Electrofilm Corp.*, North Hollywood, resigns.

GERARD C. McEVoy becomes vice president of *Pacific Tube Co.*, Los Angeles. KENNETH M. SIME is now assistant treasurer in charge of plant's cost functions, and MARY JANE JOHNSON is assistant treasurer in charge of general accounting.

J. A. WILCOX, a former operating manager for *Montgomery Ward and Co.*, and *Foreman and Clark*, is named assistant material department manager of *Lockheed Aircraft Service, Inc.*, Ontario, Calif.

ANGELO CAMPODONICO, JR., formerly general sales manager of *Regal Amber Brewing Co.*, San Francisco, is elected firm's president. He succeeds EDWARD GUNDERSON, retired. LEO T. ENGLERT, formerly assistant attorney general of California, is named executive vice president, and LOU GAVIATT fills position of general sales manager.

Chemical Process Co., Redwood City manufacturer of ion exchangers, plastics and protective coatings, fills executive posts as follows: A. E. POST, president; PAUL A. GROSS, vice president and general manager; and V. J. MORAN, treasurer.

C. W. FROUDE and CHARLES P. EVANS are both elected vice presidents of *Arrowhead Rubber Co.*, Downey.

H. G. COULSON, formerly chief engineer of *Coeur d'Alene Hardware and Foundry Co.*, Wallace, Idaho, joins *Moffatt Engineering Co.*, Albany, Calif., as designing engineer.

JAMES B. MISNER is named general manager of *San Fernando Electric Manufacturing Co.*, San Fernando. He recently returned from Washington, D. C., where he acted as a technical advisor to Army aviation program.

O. NORMAN DUNCAN, assistant refinery superintendent for *General Petroleum Corporation's* Torrance refinery, retires.

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big or little...
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press forgings, open hammer forgings, drop forgings, upset forgings, grinding media—all made by West's largest and most complete forging plant... all produced to most exacting tolerances.

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are used in the manufacture of our forgings. All forgings are heat treated under supervision of metallurgists. Complete physical and chemical reports supplied with all major components.

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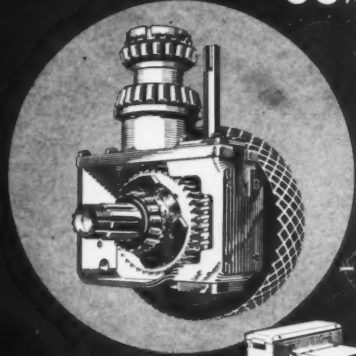
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to study, test and make sure you get the right type of forging, steel and grain structure for your job.

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HydroElectric LIFT TRUCKS

give you 50% easier steering



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about this fine
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The twin front wheel drive of a HYDROELECTRIC allows the operator to make shorter turns in closer quarters with one-half the effort of conventional single drive wheels. This is much more important than having a short truck.

The extreme ease of steering is obtained by the true automotive type of sealed-alloy gear transmission with opposed Timken bearings in steering column and wheels for true alignment. No troublesome chain drives... long life... less maintenance. Heat treated worm gears transmit power smoothly... are trouble-free for years. All gears including differential are sealed in lubricant. The entire power unit is interchangeable on all series "K" models.

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There is a model for every purpose to handle any kind of material.

Colorado

MARTIN SCHWEERS, formerly head millwright at *Colorado Fuel & Iron's* ore-bedding plant, Pueblo, becomes general foreman.

DR. K. E. MARPLE is appointed manager of Denver Laboratory of *Shell Development Co.'s* agricultural research division. He was formerly an acting department head at company's research center in Emeryville.

Montana

RUSSEL B. CAPLES, manager of Anaconda's Great Falls, Montana, reduction department, is elected president and director of *Anaconda Aluminum Co.*

Oregon

CORRECTION

In the March issue an incorrect report of changes in *Pope and Talbot's* personnel was given. The correct information is as follows: L. C. FUCHEK, who has been vice president and manager of the Puget Mill Division, becomes assistant general manager of the Lumber Division and assistant to HILLMAN LUEDDEMANN, vice president and general manager. ALDEN J. FISCHER moves up into Mr. Fuchek's former spot, and becomes an assistant vice president.

RALPH T. MOORE, head of *Moore Timber Products*, is elected president of *Rogue Hardboard, Inc.*, Grants Pass. He succeeds CHARLES COOLEY.

WILLIAM S. PILLING leaves private law practice to become assistant general counsel for *Consolidated Freightways*, Portland.

MALCOLM EPLEY, JR., is appointed assistant in promotion department of *Western*

Pine Association, Portland. He succeeds ROBERT O. LEONARD, resigned to become executive editor of *Crow's Pacific Coast Lumber Digest*.



Rod Clarke

White Motor Co. appoints ROD CLARKE manager of White freightliner division, Portland, in Los Angeles.

Utah

E. C. GARRITY becomes manager of *Cudahy Packing Co.'s* North Salt Lake packing plant. He replaces D. G. HEUGLY, who is transferred to Omaha, Neb., as general superintendent there.

IRA K. HEARN, JR., previously assistant to president of *Kennecott Copper Corp.*, is named industrial engineer to work with management of corporation's four Western mining divisions in Utah, Nevada, Arizona and New Mexico. His headquarters will be in Salt Lake City. RICHARD H. WILLEY, general foreman at Bingham mine, resigns to join *Philippine Iron Mines, Inc.*, as general superintendent.

Washington

P. N. JANSEN, production consultant at *Boeing Airplane Co.'s* Seattle division, is appointed special assistant to senior vice president. Now head of new systems analysis unit is B. F. RUFFNER, formerly project engineer in preliminary design. Further Seattle division promotions include: staff engineer, aircraft, WILLIAM H. COOK; staff engineer, systems, H. W. WITHINGTON; staff engineer, aerodynamics, H. J. LONGFELDER; and staff engineer, power plants, R. G. CHRISTENSEN.

ROBERT O. EDWARDS, former manager of Port of Seattle's foreign trade zone No. 5, returns from a two-year military leave-of-absence and is now administrative assistant.

A. G. NATWICK retires from his duties as assistant resident manager of *Crown Zellerbach's* paper mill at Camas and will become resident manager of new mill at Evadale, Tex., of *Time, Inc.* and *Houston Oil Co.*

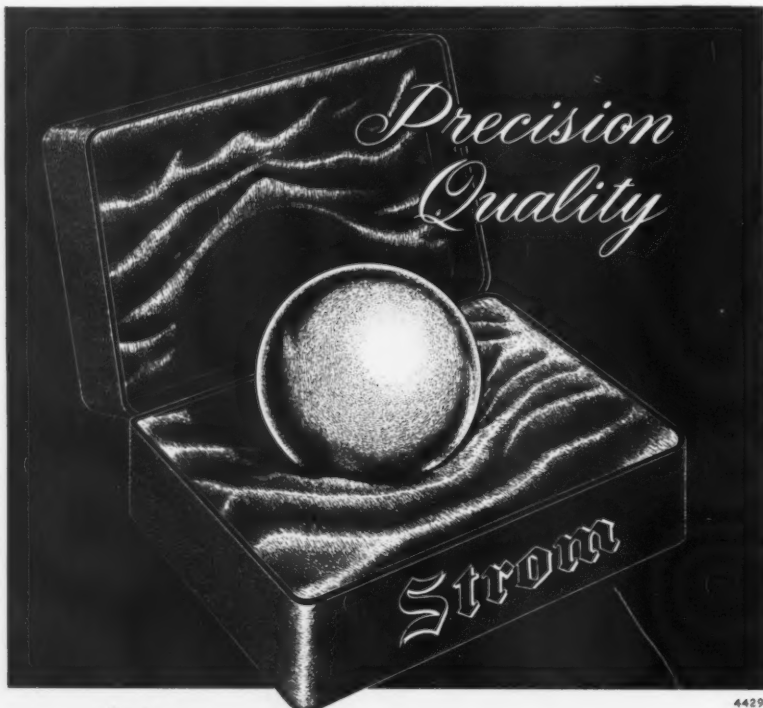
CHARLES R. BECHTEL is named personnel director of *Kenworth Motor Truck Corp.*, Seattle.

ELECTRICAL HEATING new method promises economy, flexibility

A NEW METHOD of electrical heating which makes the heat source an integral part of the heated body has been developed by B. B. Sabouni in the course of his work as engineer in charge of the development department at *Bacon Vulcanizer Manufacturing Company*, Emeryville, Calif.

Mr. Sabouni reports that it provides definitely unprecedented efficiency and flexibility of ratings, heat distribution and location, at about 50% to 75% of the cost of prevailing methods of heating by metallic resistance to the flow of electricity.

Less expensive and more flexible electrical heating results, according to Mr. Sabouni, and with the same approximate life expectancy as with prevailing methods. *Bacon Vulcanizer* has been granted the exclusive right to use the Sabouni method in the tire vulcanizing industry, with other rights retained by the inventor.



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ASSOCIATIONS ELECT

Association of American Soap and Glycerine Products: Western vice president of association, ALBERT HAAS, Sr., president of Stryker Soap Co., San Francisco.

Willamette Valley Lumber Operators Association: President, E. S. WENTJAR of Associated Plywood Mills, Inc., Roseburg, Ore.; vice president, HARRY G. KELSEY of The Long-Bell Lumber Co.; and secretary-treasurer, GEORGE A. METZGER, Eugene, Ore.

Western Forest Industries Association: President, ED KELLENBERGER, owner of Kell Lumber Co., Sweet Home, Ore.; vice presidents RAY SWANSON of Noti, Ore., and JOHN HARRIS of Redding, Calif.; and secretary-treasurer, GEORGE E. OWEN of Eugene, Ore.

Western Pine Association: President, U. R. ARMSTRONG, production vice president of Hallack & Howard Lumber Co. mill, Winchester, Idaho; vice presidents, GEORGE L. BARKHURST of Michigan River Timber Co., Laramie, Wyo., and A. B. HOOD of Ralph L. Smith Lumber Co., Redding, Calif.

Mountain States Employers Council: President, C. W. FISCHER of Hallack & Howard Lumber Co.; vice president, SAM S. SIGMAN of K & B Packing Co.; secretary and managing director, JAMES P. LOGAN. All new officers are from Denver.

Industrial Conference Board, Tacoma, Wash.: President, E. G. GRIGGS II of St. Paul & Tacoma Lumber Co.; vice president,

C. H. NYSSSEN of Northwest Chair Co.; secretary, ART I. JENSEN of Craig Furniture Co.; treasurer, JAMES BYERS of National Bank of Washington.

California Redwood Association: Chairman of traffic committee, R. J. BLITCH of The Pacific Lumber Co., Scotia.

Woodwork Institute of California: President, ROBERT HOGAN of Hogan Lumber Co., Oakland; first vice president, J. L. PIERCE of Pacific Manufacturing Co., Santa Clara; second vice president, REX SPORLEDER of Hollenbeck-Bush Planing Mill, Fresno; treasurer, JAMES MOORE of Long-Bell Lumber Co., San Francisco.

Canners League of California: Industry vice president, JOHN E. DODDS of Schuckl & Co., Sunnyvale, Calif.

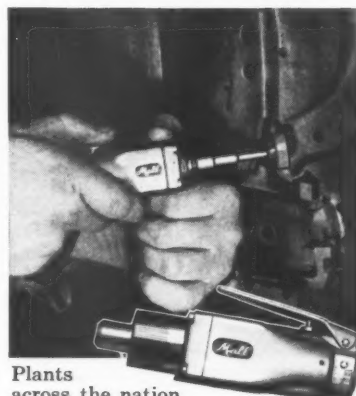
National Association of Manufacturers: Head of research committee, R. G. FOLLIS, San Francisco, chairman of the board, Standard Oil Co. of Calif.; members of research committee, Dr. ROBERT K. CUTTER, president of Cutter Laboratories, Berkeley; STERLING M. GARDNER, president of Gardner Electric Manufacturing Co., Emeryville; A. B. LAYTON, vice president of Crown Zellerbach Corp., San Francisco; Dr. HAROLD J. LOEFFLER, president and general manager of Glacier Packing Co., Inc., Sanger; and H. G. VESPER, president, California Research Corp., San Francisco.

Northwest Mining Association: President, FRANK N. MARR, president of Spokane-Idaho Mining Co.; vice president, P. C. FEDDERSEN, superintendent of Bunker Hill & Sullivan lead smelter, treasurer, E. K. BARNES.

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HI-FIRE BOND Dry, heat setting high temperature bonding mortar. Forms a sinter bond.

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DENVER FIRE CLAY
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NEW YORK, N.Y. **DENVER, COLO., U. S. A.**

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Western TRADE WINDS

News about those who distribute and
sell industrial equipment and materials

ROBERT W. JEFFERY is appointed general sales manager of *Currier Co.*, Oakland.

DR. LEON C. GLOVER is now in charge of Pacific Coast product and sales development department of *Julius Hyman & Co.* division of *Shell Chemical Corp.*, with headquarters in San Francisco. Formerly head of entomology department at Shell's Modesto agricultural laboratory, he replaces Dr. S. H. BENEDICT who will become company's area representative in Pacific Northwest.

KNEELAND NUNAN, formerly vice president in charge of sales at *Consolidated Engineering Corp.* of Pasadena, is elected executive vice president of *Consolidated Vacuum Corp.* of Rochester, N. Y. Consolidated's newly acquired subsidiary. He replaces HUGH F. COLVIN who returns to Pasadena to assume duties of treasurer of parent company.



K. Nunan

J. Oliver

JAMES OLIVER is named district manager in Pacific Northwest for *Hyster Co.* His headquarters will be in Portland. Territory will include Washington, Oregon, Idaho, part of Northern California, Western Canada and Alaska.

W. A. BROWN is placed in charge of *Goodall Rubber Company* Inland Empire area with headquarters in Spokane. He was formerly with *Texas Co.* as lubrication engineer for State of Washington.

GORDON W. DENNIS, formerly of pallet division, *Larson Ladder Co.* of San Jose, leaves company to join *Bulldog Pallet Co.*, Newark, Calif., as sales manager.

A. P. Stewart and Associates is a new food processing consultants firm in San Francisco, formed by a trio from *Golden State Co., Ltd.*'s research department. DR. STEWART was in charge of research, R. A. JOHNSON was a chemical engineer and Miss PATRICIA TOBIN was Dr. Stewart's administrative assistant.

Morris P. Kirk & Sons, Inc., is now Pacific Coast distributor of "cinch expansion bolt," basis for an anchoring system used in building and construction industries. Formerly handled by *National Lead Co.*, cinch bolts will be available through all Kirk & Sons branches.

Horace Blackman Co. of Beverly Hills is appointed exclusive agent in California, Arizona and Nevada for Boltaron 6200, a rigid, non-plasticized polyvinyl chloride material.

BRUCE ADAMS is appointed to Portland sales office of *The Trane Co.*, La Crosse, Wis., maker of air conditioning equipment.

Alexander H. Kerr & Co., Inc., names as Northern California distributor of its translucent, structural panels, *Kyle & Co.* with warehouses in Fresno, Stockton and Sacramento. J. BURTON TRIPP is promoted from position of district representative of Los Angeles area to that of sales manager for entire packers' ware division of *Alexander H. Kerr & Co., Inc.*

Two new subsidiary sales organizations formed by *Latchford-Marble Glass Co.* now distribute parent firm's glass products and also handle a general line of bottlers' accessories and supplies. San Francisco and Fresno areas are covered by *Latchford-Marble Container and Supply Co.*; in Southern California territory, *Latchford-Marble Package and Supply Co.* is representative.

MARTIN F. ANDRESEN, who has been on leave in active duty as a Major in U. S. Air Force Reserve, returns to *Martin Brothers Box Co.*, Whittier, Calif. He will cover Central California territory for company. W. F. CRUISE is assigned to Southern California territory.

Plastic Materials Supply Co., Temple City, Calif., is appointed West Coast distributor of *Schwartz Chemical Co., Inc.* JACK M. NIMS, formerly vice president and sales manager of *Calresin Corp.*, is now head of Plastic Materials. L. R. d'ASSELAUX, formerly vice president and sales manager of *Plas-tex Corp.*, is appointed general sales manager of *Calresin Corp.* Calresin also names HENRY KVEEN as research director of Arcadia and Ottumwa, Iowa, plants.

JAMES BARR, JR., joins *Otto H. Rosenreiter*, South Gate, Calif., in promotion of sales and service of following foundry equipment manufacturers: *National Engineering Co.*, Chicago; *The Foundry Equipment Co.*, The Osborn Manufacturing Co., and *Young Brothers Co.*, all of Cleveland.

H. WALLER, formerly in *Republic Steel Corp.*'s Salt Lake City office, is named district sales manager of *Truscon Steel* division in San Francisco territory including Utah and Intermountain areas. He succeeds GEORGE CARNEY, who now covers California-Nevada area as engineering sales representative.

Republic Supply Co. of California is appointed distributor of polyken industrial tape, manufactured by *Bauer & Black*, a division of *Kendall Co.*, Chicago.

MARVIN O. CHRISTMAN becomes manager of advertising and sales promotion for *General Electric Co.*'s Pacific Northwest apparatus district including Washington, parts of Oregon, Idaho, and Montana, and entire territory of Alaska. SAMUEL G. GEARHART retires from industrial division of *General Electric's* San Francisco office.

Kittleson Co., Los Angeles electronic representative, is made representative in four Western states for *Reon Resistor Co.*, Yonkers, N. Y., manufacturer of wire wound resistors.

National Cylinder Gas Co.—Pacific Coast consolidates its Los Angeles offices and warehouse facilities into a new 19,500 sq. ft. building.

M. A. ELLSWORTH, formerly vice president of mid-continent area, is named vice president and sales director of *Fluor Corp.*, Los Angeles. He succeeds J. P. WISEMAN, now president of *Fluor Corp.*, of Canada.

RUSSELL G. DALEY, field engineer for *Standard Conveyor Co.*, N. St. Paul, Minn., transfers from home office to Seattle to establish a field office there.

Norman S. Wright & Co., West Coast distributing firm, establishes an office with warehouse facilities at Phoenix, Arizona. New facilities are under direction of ROBERT LANGMADE.

HARRY W. BRYSON, JR., is appointed sales service representative of *Hooker Electrochemical Co.* at Tacoma. His activities cover service on caustic soda, chlorine and ammonia; territory includes Pacific Northwest states, British Columbia and Alaska.

PAUL E. BRYANT is named general manager of *Hoffman Radio Corp.*'s Los Angeles distributing organization. Hoffman sales division. He resigned as Western sales manager of *Zenith Radio Corp.* to accept new post.

CHARLES A. THURMOND leaves San Francisco marketing staff of *Monsanto Chemical Co.* to head up market development for Union Oil's new subsidiary, *Brea Chemical Co.*, Los Angeles.

HOWARD B. EVANS, formerly director of dealer development and sales training for *Iron Fireman Corp.* in North Atlantic states, transfers to Los Angeles where he will be responsible for expanding firm's dealer organization throughout California.

Goodall Rubber Co. inaugurates a new telephone call-and-follow-up service in Spokane, Wash. Number to call is Madison 8131. T. BROWN, covering area from company's Seattle branch, will answer calls.

JERRY TOPPEL, Denver, Colorado, is named representative in Montana, Wyoming, Colorado and New Mexico for *Adams-Rite Manufacturing Co.*'s line of builders' hardware.



J. Toppel

C. W. Sawhill

Aero-Coupling Corp., Burbank, a subsidiary of *Aeroquip Corp.*, appoints CHARLES W. SAWHILL as its industrial sales manager. Prior to this appointment, he represented company as sales engineer throughout West, Southwest, and in Mexico.

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Put conveyors to work moving cases, cartons, packages, parts, units through manufacturing or processing to storage or shipping. Speed handling operations — reduce breakage — increase safety — save manpower, time, and costs.

An experience record of more than 45 years, serving all classes of industry and business, qualifies Stand-

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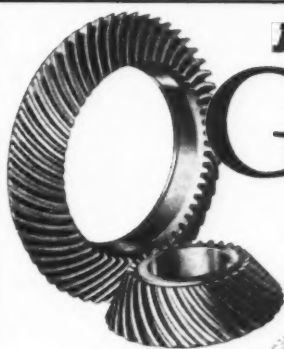
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Standards That Assure Quality Gears

Into every gear-cutting job at the Johnson plant goes an engineering knowledge and an experience gained through nearly half a century . . . solving problems and manufacturing gears for highest efficiency and dependability. The more particular you are in selecting gears, the more likely you are to choose Johnson.

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The Lufkin Line

By VIC FAWCETT



Vic Fawcett

SULPHUR and MOLASSES

With a certain amount of disdain and an acute remembrance of the horrible taste we are reminded of childhood, spring-time and sulphur and molasses.

We've never quite clearly decided whether the chemical components of sulphur and molasses soothed your system and purified your soul or whether it was just the doggone horrible taste that frightened you into the feeling that "all's right with the world" hoping thereby to curtail any further doses of the stuff.

Strange as it may seem, spring has a different meaning and we might add, a more pleasant one when we devote our time to dreaming of fishing and being lazy, golfing and being lazy, and just plain being lazy.

You might be wondering how we may be able to relate this to Lufkin's fine line of Gear Increasers and Reducers. Well, when you're as sold as we are, it's easy!

We think spring, for that matter any time of the year, is a good time to look into the performance of the gear setup you're using or may want to use. This will present you with a springtime activity similar to your wife's spring cleaning. Subsequently, you will probably want information on why Lufkin Gears may be just the "sulphur and molasses" your operation needs, which in turn, will give us so much to do that we won't have time to acquire spring fever. We probably won't even get to go fishing.

Isn't it wonderful to think of all the things we can to make our job as pleasant as possible. Providing you with gear information is the most pleasant thought we have, for it is based on years and years of gear experience, all available to you on a minute's notice and all much easier to swallow than sulphur and molasses.

Vic Fawcett

PACIFIC COAST DIVISION
5959 S. Alameda St., Los Angeles 1, Calif.
AGENCY—ADAM HILL CO.
244 - 9th St., San Francisco, Calif.
Dallas Lufkin, Texas New York

Orchard Supply Co., San Jose, managed by PETER KEENAN, is appointed dealer in this area for Reeves Pulley Co.

S. E. SMITH, JR., formerly supervisor of classroom apprentice training for Caterpillar Tractor at San Leandro, joins Machinists Tool & Supply Co., Los Angeles, as wax lubricants specialist.

CRAIG C. CARPENTER is promoted by Soule Steel Co. to post of assistant general sales manager. He transfers from firm's Eastern office in Washington, D. C., to take new job. He will be located at Soule's main office in San Francisco.



C. C. Carpenter



W. E. Fertig

WALTER E. FERTIG is named sales representative of The Stanley Works for its steel strapping division in Northern California with headquarters in San Francisco. He was previously with Monroe Calculator Co., Portland.

Jongeward Electric Motors, Inc., is now serving as distributor in Yuma County, Arizona, for Allis-Chalmers Manufacturing Co.'s Texrope drive equipment.

GEORGE ZETTLER, previously Flying Tiger Line, Inc.'s city sales manager at San Francisco and Denver, is named city sales manager in Oakland. He succeeds VAN HURD who transfers to a new office in Sacramento.

WILLIAM C. TAGMYER, recently tubular sales manager of Taylor & Spotwood Co., is named sole Northern California agent for Tubesales, Los Angeles distributor of steel tubing. His headquarters will be in San Francisco.

WILLIAM G. BLOODGOOD is promoted to post of assistant general sales manager of Air-Parts, Inc.

L. W. WESTERBECK, formerly A. M. Castle & Co. district manager, becomes sales manager of Brown Steel Supply Corp., new steel

warehouse firm in Los Angeles. WESLEY M. SHERWOOD, previously in charge of sale for Dunning Iron Store Co., is now Brown Steel's assistant sales manager.

Yosemite Chemical Co. establishes a branch in Los Angeles which will function as manufacturer's agent for Malsbary steam cleaning machines.

R. C. HARPER, previously sales manager of Sylvania Electric Products, Inc.'s lighting division, is named sales manager of division's Los Angeles district. WILLIAM L. FRIEND, formerly field representative in Los Angeles, becomes manager of San Francisco district.

NELSON A. HOWARD, JR., Los Angeles, is appointed Southern California representative of Jefferson Chemical Co., N. Y. City, wholly-owned subsidiary of American Cyanamid and The Texas Co.

Circle Seal Supply Co., Pasadena, is appointed by Deutsch Co. of Los Angeles as Southern California distributor of Deeco line of industrial flared tube fittings.

ARTHUR NEEL joins Connor Spring Manufacturing Co. as salesman in Los Angeles area.

H. B. MONTROSS, JR., formerly senior technical field representative in Seattle area, is appointed manager of market development department of Columbia-Geneva Steel division, United States Steel Corp. JOHN E. MATROS, formerly resident technical field representative at Stockton, Calif., is promoted to manager of heavy products sales.

Leslie Salt Co. appoints J. D. HEINEN to position of district manager for Southern California and Arizona area. He will be in complete charge of firm's district office in Los Angeles.

PAUL WINKLER, formerly electrical and mechanical engineer with Bardwell & McAlister, Inc., Burbank, Calif., is named sales manager of that firm's Rosan division.

Ownership of Emil C. Buehrer Associates, Inc., San Francisco franchise representative of Automatic Transportation Co., Chicago manufacturer of electric industrial trucks, is taken over by OWEN L. JENKINS and THOMAS A. FLETCHER.

ROBERT T. PRATT, formerly assistant sales manager of Clary Multiplier Corp., San Gabriel, Calif., is named that firm's Eastern regional sales manager. He succeeds FRANK L. RANDALL, resigned.

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CLASSIFIED SECTION

Space is sold as advertisers' inches. All advertisements in this section are 1/8 inch short of contracted space to allow for borders and composition. Rates are \$7.50 a column inch. Copy should be sent in by the 25th of preceding month if proofs are required; by the 28th if no proofs are required.

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FREE DELIVERY ANYWHERE

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Complete with radiator and clutch.

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Also 3000 gal. butane tank.

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We offer for sale, in excellent condition and used very little—Two (2)—G.M. 200 KW Diesel Power Units, model #8-268A, each equipped with D.E. switchboard. Write or wire

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TOOLS and EQUIPMENT

6 ga. 8 ft. sheet metal brake.....\$395
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10 hp. Clayton steam generators.....\$400
2 Motorized Rotary bending Machines, each...\$ 76

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INDEX TO ADVERTISERS IN THIS ISSUE

A			H			R		
Allen-Bradley Co.	51 & 52		Harnischfeger Corporation	19		R & K Industrial Products Co.	82	
Allis-Chalmers Mfg. Company	18		Hyster Co.	23		Reliable Pattern Works & Foundry	84	
American Appraisal Company	106					Republic Supply Company		
American Blower Corporation, Division of			J			of California	78 & 104	
American Radiator & Standard			Johnson Gear & Mfg. Co.	107		Revere Copper and Brass, Incorporated	49	
Sanitary Corporation	6		Johnston, A. P., Co.	110		Ridge Tool Company	81	
American Chain Division,						Roper, Geo. D., Corp.	64	
American Chain & Cable	73		K			Ross, J. O., Engineering Corporation	95	
American Felt Company	25		Kaiser Steel Corporation	27		Rucker Co., The	22	
American Forge Co.	103		King Publications	98		Ryerson, Joseph T., & Son, Inc.	32	
American Forge Division,			Kyle & Co.	91				
American Brake Shoe Co.	15					S		
American Monorail Company, The	10		L			Santa Fe Railway	67	
Anaconda Wire & Cable Company	63		Ledeen Manufacturing Co.	78		Scientific Lubricants Co.	99	
Automatic Switch Company	61		Lewis-Shepard Products, Inc.	70		Screw Conveyor Corp.	115	
B			Lift Trucks, Inc.	103		Sierra Drawn Steel Corporation	12	
Binks Manufacturing Company	75		Lubriplate Div.,			Signode Steel Strapping Co.	53	
Blackmer Pump Company	92		Fiske Brothers Refining Company	58		Smith, A. O., Corp., Motor Division	102	
C			Lufkin Foundry & Machine Co.	108		Smoot-Holman Co.	94	
California Barrel Company, Ltd.	Cover 2		Lyon Metal Products, Incorporated	69		Snap-On Tools Corporation	28	
Chase Brass & Copper, Subsidiary of			M			Soulé Steel Company	114	
Kennecott Copper Corporation	71		Maas, A. R., Chemical Company	95		Standard Conveyor Company	107	
Chicago Bridge & Iron Company	62		Mall Tool Company	105		Standard Horse Nail Corporation	97	
Clingan & Fortier, Inc.	92		Martin Bros. Box Co.	72		Standard Oil Company of California	17	
Colorado Fuel & Iron Corporation, The			Master Electric Company	13		Stanley Works, The	100	
(Wickwire Spencer Steel Div., The			Mathews Conveyor Co.	54		Stephens-Adamson Mfg. Co.	Cover 4	
California Wire Cloth Corporation)	115		Metal & Thermit Corporation	55		Strom Steel Ball Company	104	
Colson Equipment & Supply Co.	24		Metropolitan Supply Co.	99				
Columbia-Geneva Steel Division,			Miller-Robinson Company	75		T		
United States Steel Corporation	7		Moore Dry Dock Company	117		Thermoid Co.	77	
Cooper Alloy Foundry Co.	9					Tuthill Pump Company	76	
Crane Co.	31		N					
D			National Screw & Manufacturing			U		
Denver Fire Clay Company	105		Company of California	8		United States Steel Corporation	7	
Detroit Power Screwdriver Co.	88		National Welding			V		
Dick, R. & J., Co., Inc.	93		Equipment Company	Cover 3		Victor Equipment Co.	89	
E			Nutting Truck & Caster Company	96		Viking Pump Company	94	
Evis Manufacturing Co.	14							
F			O			W		
French & Hecht Division,			Oakite Products, Inc.	96		Webb, Jervis B., Company of California	21	
Kelsey-Hayes Wheel Company	83		Ohio Seamless Tube Company, The	29		Western Gear Works	3	
Fruehauf Trailer Company	5					Watson-Stillman Fittings Division,		
G			P			H. K. Porter Company, Inc.	59	
Garrett Supply Co. (Div. of			Pacific Gas & Electric Co.	113		Western Insulated Wire Co.	68	
Garrett Corp.)	106		Pacific Telephone & Telegraph Co.	90		Windeler, George, Co., Ltd.	99	
General Electric Company	11		Penna Flexible Metallic Tubing Co.	98				
General Petroleum Corporation	65		Perin, Ira G., Co.	100		Y		
Green-Penny Co.	30		Petley Incorporated	83		Yuba Manufacturing Co.	102	
Grinnell Co., Inc.	16		Powers Regulator Co.	97				
			Printed Cellophane Tape Company	26		Z		
						Zurbach Steel	108	

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CO.
1953





THE West ON ITS WAY

NEW PLANTS, EXPANSIONS, NEW INDUSTRIES, PRODUCTION CONTRACTS,

DEVELOPMENT PROJECTS, UTILIZATION OF RESOURCES

THE WEST had a faster rate of growth, percentage-wise, in industrial production from 1947 to 1951 than the rest of the country. And in that same period the West gained an additional per cent of the nation's industrial output.

So says the 1951 Survey of Manufactures, released on March 12 by the U. S. Census Bureau. The figures on which the percentages are based are the "Value added by manufacture," which approximate the value created in the manufacturing process, and are derived by subtracting the cost of materials, supplies, etc., from the total value of products shipped.

While the West gained 51.5%, the rest of the nation advanced only 35%. The Mountain States kept up almost even with the Pacific States, having a 50% rate of growth compared with 52% for the coastal area. Back in 1947 the eleven Western States' share of national production was only 8.5%; in 1951 it had moved up to 9.5%.

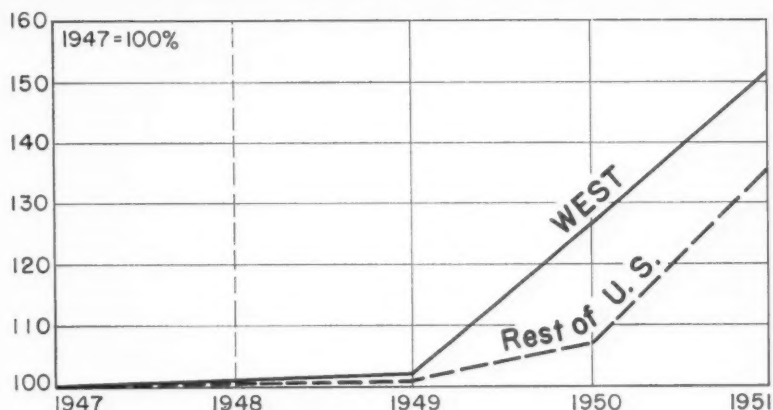
In dollar volume, the West's increase was \$3,297,771,000. In 1947 the total was \$6,383,236,000, while in 1951 it was \$9,681,007,000. The output for the rest of the country rose from \$68,042,589,000 to \$92,404,807,000 between 1947 and 1951.

This spurt on the part of the West apparently is due to a contraction in materials available for consumer goods resulting from the international situation. This affected the rest of the U. S. more than the West.

A NEW FEATURE

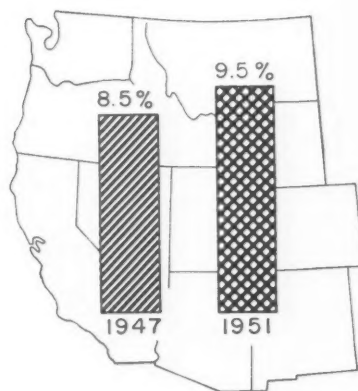
Beginning with this issue, important facts about the West's economy will be featured on the opening page of "The West on Its Way." Always an important department in Western Industry since the earliest days, it now provides additional value for our readers.

WESTERN INDUSTRIAL PRODUCTION GROWS AT FASTER RATE THAN REST OF COUNTRY



WEST ALSO GAINS EXTRA SHARE OF TOTAL OUTPUT

CHART at top of page shows comparative percentage of growth, as reported by the Census Bureau in terms of "value added by manufacture." Chart at right shows how the West has gained an extra share of actual output.



FIGURES ON WHICH CHARTS ARE BASED

Value added by manufacture . . . in millions of dollars

	1947	1949	1950	1951	% of gain, 1947-1951	% of U. S. total, 1951
Pacific	5,544	5,727	7,041	8,423	52.0	8.3
Mountain	839	782	1,042	1,257	50.0	1.2
TOTAL WEST	6,383	6,511	8,083	9,681	51.5	9.5
TOTAL REST OF U. S.	68,043	68,856	72,666	92,404	35.0	90.5

Source: 1951 Annual Survey of Manufactures, Bureau of Census, U. S. Department of Commerce. 1948 not available.

See page 118 for indexes of Western Industrial Production

ALASKA

FREIGHT LINES MERGER—Alaska Freight Lines, operator of barge-truck-trailer service between the United States and Alaska, takes over Ocean Van Lines' van equipment and operation between Seattle, Tacoma and Alaska.

POSSIBLE PULP PLANT—Georgia Pacific Co., New York, has under consideration construction of a \$56,511,000 pulp and newsprint plant near Juneau. Construction would include a chemical pulp plant, ground wood pulp plant, paper mill and power plant. Production would be approximately 96,000 tons yearly.

MORE ABOUT PULP—Pacific Northern Timber Co., Portland, Ore., is granted a certificate of necessity to build a \$4,502,570 saw mill and pulp chip plant near Wrangell. Plant would utilize approximately 250,000,000 board ft. of timber annually.

ARIZONA

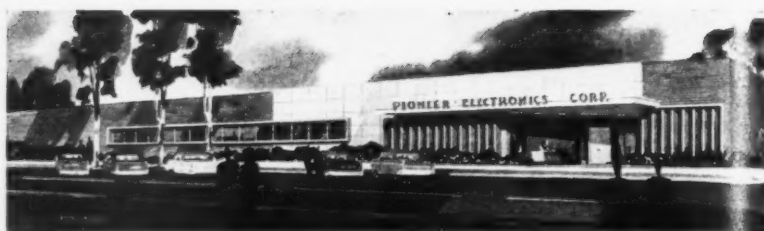
CERTIFICATES OF NECESSITY—Defense Production Administration issues certificates of necessity for the following defense-connected industrial projects: Producers Cotton Oil Co. of Arizona, Yuma, \$953,860 for cottonseed processing; Reynolds Metals Co., Phoenix, \$165,214 for aluminum extrusions; Goodyear Aircraft Corp., Litchfield Park, \$123,781 for aircraft and parts.

MAGMA PLANT NEGOTIATIONS—Magma Copper Co. and its subsidiary, San Manuel Copper Corp., are negotiating with Utah Construction Co. and Stearns-Roger Manufacturing Co. to design, engineer and build a \$50,000,000 surface plant for San Manuel development near Tiger.

CALIFORNIA

RUBBER MERGER—Goodyear Rubber Co., San Francisco, purchases Alco Rubber Co., San Leandro. Expansion plans will be announced later.

LINDBERG TRIPLES—Lindberg Steel Treating Co. expands its Los Angeles facilities with a new plant at 2910 Sunol Drive which covers 14,000 sq. ft. of floor space. Besides heating of ferrous and non-ferrous metals, plant specializes in treatments such as hydrogen annealing, induction heating, flame hardening, Malcomizing, nitriding, sand blasting and liquid honing.



WEST GETS THE PICTURE—Pioneer Electronics Corp., Santa Monica, plans construction of a new plant for manufacture of television picture tubes. New plant will have 30,000 sq. ft. of enclosed space and 20,000 sq. ft. of paved ground for parking, loading and expansion. It will cost approximately \$200,000 to build.

CONVAIR STOCK FOR GENERAL DYNAMICS—General Dynamics acquires 400,000 shares of Consolidated Vultee Aircraft Corp. stock from Atlas Corp. for \$8,700,000 cash, and 20,000 shares of original issue common stock of General Dynamics Corp. Atlas Corp. retains 30,300 shares of Convair as a portfolio investment. Stock transfer represents approximately 17% of the 2,400,000 common shares presently outstanding.

MORE BRANCH PLANTS IN L. A.—More than 300 nationally known companies now operate branch plants in Los Angeles County. Of these 51 are Chicago companies; 48 are New York City firms.

PIT 4 POWERHOUSE FOR PG&E—Pacific Gas and Electric Co. awards contract for its \$25,000,000 Pit 4 Powerhouse project on the Pit River in Shasta County to Morrison-Knudsen Co., Boise, Idaho. Plans call for excavation of a 100,000 cu. yd. of earth.

MINNEAPOLIS-HONEYWELL EXPANSION—Minneapolis-Honeywell Regulator Co., manufacturer of automatic controls, commences construction on a new factory at Gardena which will ultimately employ 2,000 persons. Plant will occupy a 16-acre site at 174th St. and Western Ave. Factory will be of steel frame, reinforced concrete construction and of functional design.

MORE METERS MENTIONED—A 350,000 population growth in Southern California area served by Pacific Lighting Corp. subsidiaries added 95,089 meters to that firm's lines in 1952. Pacific Lighting spent \$41,838,000 on capital additions during this period.

OIL STORAGE—Standard Warehouse Corp. purchases storage facilities abandoned by Standard Oil Co. at Lyoth, near Stockton. Large bulk storage tanks on this property have been cleaned and made ready for bulk storage of essential oils. Additional development of the property is under consideration.

MORE MISSILES BY NORTHROP—Contracts recently received by Northrop Aircraft, Inc., Hawthorne, for U. S. Air Force guided missiles, bring that company's order backlog to an all-time high of \$500,000,000.

TWO NEW PLANTS FOR ALLIED—Allied Chemical & Dye Corp. plans construction of an aluminum fluoride plant at Bay Point, near San Francisco. Fluoride for production will come from Kaiser Aluminum & Chemical Corp.'s Nevada mine. Finished product will be shipped

to Kaiser aluminum reduction mills in the Pacific Northwest. Allied Chemical & Dye Corp. will also build a nitric acid plant near Hanford, Wash., to supply this vital material for the atomic energy operation there.

SOFT STUFF—Reed Feather Co., manufacturer of bed pillows, opens a new plant at San Francisco. In it will be installed the feather and down processing machinery formerly operated by Simon Mattress Manufacturing Co., and recently purchased by Reed Feather Co., which also operates a plant in Los Angeles.

NAME CHANGE—Independent Engineering & Drydock Co., Alameda, changes its name to Plant Shipyard Corp. Change is in name only and does not affect management or ownership. This comparatively new facility is privately owned by members of the Bechtel, Pomeroy and Plant families.

CASPER'S BUYS WESTERN PLANT—Zahn Steel & Lithographing Co., Santa Clara County, is purchased by Caspers Tin Plate Co., Chicago. Plant will be operated as firm's Western subsidiary.

LIBBY EXPANSION—Libby, McNeill & Libby starts construction of new frozen food expansion at Sunnyvale plant. Plans call for \$400,000 investment in buildings and equipment adjacent to the present Libby plant. A concrete structure 160 x 300 will be completed in early summer. Additional facilities will be used for green beans, lima beans and freestone peaches.

ANOTHER ACQUISITION FOR FMC—Food Machinery and Chemical Corp. acquires Milwaukee Equipment Manufacturing Co., South Milwaukee, Wis., producer of rotary tillage equipment, for an undisclosed price. Tillage firm will be operated as a subsidiary of FMC and as an affiliate of the parent corporation's Bolens Products Division, which manufactures garden tractors and power lawn mowers at Port Washington, Wis.

SMITH-BLAIR CONSOLIDATES OPERATIONS—Smith-Blair, Inc., South San Francisco, acquires a long term lease on 1½ acres of ground adjacent to main plant for future expansion. Company has also added 4,500 sq. ft. of space under cover for increased production and assembly.

MR. WIGGINS' COUPLING PATCH—E. B. Wiggins Co., Los Angeles manufacturer of couplings, leases an additional plant to augment production

Continued on page 114



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view, then show you how to obtain a comfortable seeing environment to boost production and reduce errors. Cost of this service to you: nothing!



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PACIFIC GAS AND ELECTRIC COMPANY

47-53

WEST ON ITS WAY

... Continued from page 112

facilities for coming year. Predicted sales for 1953 will more than double last year's record. Valuation of equipment and facilities at new plant is approximately \$475,000.

CERTIFICATES OF NECESSITY—Defense Production Administration issues certificates of necessity for the following defense-connected industrial projects: U. S. Rubber Co., Los Angeles, \$690,460 for military type tires; Southern Pacific Railroad Co., Kaiser, \$297,830 for railway transportation; Southern Pacific Railroad Co., San Francisco, \$26,652.-288 for railway transportation; Pacific

Gas and Electric Co., San Francisco, \$8,767,200 for natural gas transmission; Pacific Gas and Electric Co., Madera County, \$171,253 for natural gas transmission; Zinco Electrical Products, Los Angeles, \$138,675 for high voltage switchgear; Southern California Edison Co., Los Angeles, \$93,864 for electric power; Johns-Manville Products Corp., Lompoc, \$1,976,443 for calcined diatomite; Shell Chemical Corp., Dominguez, \$400,000 for methyl isobutyl ketone; Black Rock Mining Corp., Bishop, \$2,027,834 for tungsten; Sturgess, Inc., Glendale, \$161,918 for aircraft parts; Food Machinery & Chemical Corp., San Jose, \$84,000 for ordnance; and Lockheed Aircraft Corp., Burbank, \$2,875,000 for airplanes and parts.



Left to right: A. J. Dovey, sales manager of Arrowhead Rubber Co., C. W. Froude, general manager, Long Beach, and George Bartlett, contractor.

ARROWHEAD RUBBER STRETCHES

—Arrowhead Rubber Co., Long Beach, division of National Motor Bearing Co., Inc., adds 20,000 sq. ft. of floor space to its plant to house increased production facilities as well as sales department now housed at Downey plant. Approximately 100 people will be added to Arrowhead's payroll under expansion program.

SUNNYVALE INDUSTRIAL DISTRICT

—A Bay Area investment group purchases more than 300 acres near Sunnyvale as the site for a multi-million-dollar controlled industrial district. A reported \$900,000 was spent by a group of Bay Area financiers represented by Norris, Beggs & Simpson, San Francisco realty firm, and the Southern Pacific Railroad Co. Developers will sell land in this district to selected industries, finance construction of plants and improvements, or built to suit tenants.

LASSEN LUMBER AND BOX SOLD—

The Forward Brothers Lumber Co., Red Bluff, purchases Lassen Lumber and Box Co., Susanville. Plant, which will be moved to Red Bluff, will cut between 80,000 and 100,000 ft. of lumber per shift and will employ nearly 100 men.

NEW DIVISION FOR ENGINEERING FIRM—

Aircraft Engineering and Maintenance Co., Oakland, establishes an electronics division in Oakland. New division will specialize in research and development, mass production of component parts of electronics devices, communication equipment and sub and final assembly of parts and finished products.

MONSANTO TO MOVE—

Monsanto Chemical Co.'s Western division at Seattle will be moved to Santa Clara. A plant for manufacture of vanillin, just completed in Seattle, will continue to serve as sales and production headquarters for company's plywood adhesives, industrial resins and related products for the lumber and plywood field.

INDUSTRIAL SCHOLARSHIP PLAN—

Pressed Steel Car Co., Inc., Chicago, inaugurates a new plan of industrial scholarships for sons of employees of that firm, and its Vernon subsidiary. Axelson Manufacturing Co. Winners of these scholarships will attend University of Southern California. Scholarships consist of \$1,150 annually for tuition, books,

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room and board, in addition to amounts up to \$700 for miscellaneous expenses.

ANOTHER STRIPE FOR STANDARD—Standard Oil Co. of California forms a new wholly-owned subsidiary, Chevron Oil Co., to carry on geophysical work for parent company and other subsidiaries in the United States.

GROUND BROKEN FOR TRAILERS—Weber Trailer & Manufacturing Co. breaks ground for its new factory on an 8-acre site in Rivera outside city limits of East Slauson. Firm's manufacturing and service operations, including aluminum body vans applicable to both dry freight or refrigerated hauling, will center at new location around September 1.

COPPERS FOR CANNING—Pacific Olive Co., Visalia, is in process of buying Visalia Canning Co. for \$400,000 with purchase option indicated to be picked up before expiration date of May 30. Purchase is partially financed through sale of stock in Visalia area.

COLORADO

FERTILIZER PLANTS AT CANON CITY—National Farmers Union has tentative plans to build two commercial fertilizer plants at Canon City. One would be a \$4,000,000 plant to process phosphate from NFU holdings in north-eastern Utah, and the other would be a \$2,000,000 plant to be erected by New Jersey Zinc Co., to recover sulphur gases

now wasted as smoke from that firm's zinc plant at Canon City.

STANLEY AVIATION TO COLORADO—Stanley Aviation Corp., Buffalo, N. Y., will shortly commence construction of a \$400,000 branch factory near Stapleton Airfield, either in Denver or Aurora. Firm plans to purchase or lease about ten acres, and about 200 persons will be employed. New factory will produce and test ejection seats for B-47 jet bombers and the Navy's prototype of the Sabre jet, the FJ-3.

NEW DIVISIONS FOR FOX METALS—Fox Metal Products Corp., Littleton, adds two new divisions to supplement its four manufacturing, fabricating and installation units. One is Pepper Tank & Ironworks Co., formerly Pepper Tank Co., Denver, which will turn out a complete line of tanks. The other is Woodcrafters, a newly created business, which will provide equipment and furnishings for restaurants, hotels, taverns, and schools.

DENVER HEADQUARTERS FOR SHELL—Shell Oil Co., San Francisco, establishes a new exploration and production organization embracing North and South Dakota, Montana, eastern Wyoming and eastern Colorado. Headquarters will be set up at Denver. New office is being organized because of growing importance of Shell's operations in the Williston Basin and Denver Basin oil fields.

ROOF PLANT NEAR DENVER—Largest roofing plant between Mississippi and

West Coast is being constructed just northwest of Denver. Plant, to be known as Lucky Star Roofing Co., is a \$500,000 project, located on a 13½-acre tract, and covering 44,000 sq. ft. An operating force of 65 will manufacture asphalt roll goods, building papers and shingles for industrial and residential roofs.

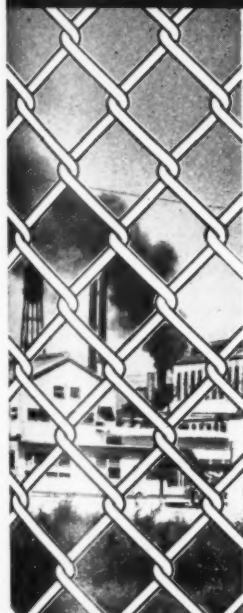
COAL IN THEM THAR HILLS—Coal is now being produced from the east portal of the Colorado Fuel and Iron Corp.'s Allen mine near Stonewall. Coal, which is shipped to firm's Pueblo steel mills, is brought from east portal via conveyor to a giant Bradford breaker, and then is conveyed to loading chutes above Colorado & Wyoming railway tracks where it is loaded into cars, and forwarded to the mills.

IDAHO

POCATELLO PRODUCTION—J. R. Simplot Co. is scheduled to begin production this month of triple superphosphate fertilizer at its Pocatello plant. Annual production will be about 90,000 tons. Plant's yearly output of single strength phosphate is rated at 200,000 tons.

AEC AWARDS CONSTRUCTION CONTRACTS—U. S. Atomic Energy Commission awards Utah Construction Co. a \$4,583,028 contract for first phase construction of ground testing facilities for a prototype aircraft propulsion reactor at its National Reactor Testing Station,

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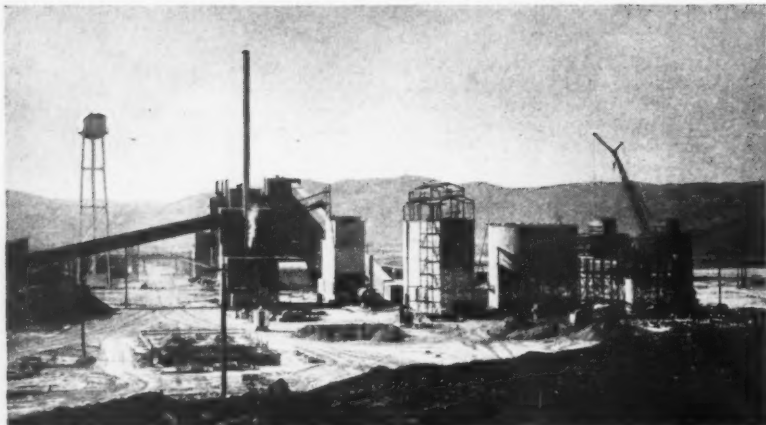
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SODA SPRINGS PLANT IN PRODUCTION—Monsanto Chemical Co.'s new plant at Soda Springs is now in production. It contains world's largest electric furnace for refining elemental phosphorus, and will produce approximately 10% of all elementary phosphorus products in the United States.

Idaho Operations Office, Idaho Falls. Wadsworth Construction Co. is awarded a \$57,935 contract to construct sewage treatment facilities at the same location.

MACHINERY FIRM FORMED—Jameison Machine Supply, Inc., is incorporated at Lewiston to serve logging and sawmill industries. New firm is capitalized for \$120,000.

NEVADA

CERTIFICATE OF NECESSITY—Defense Production Administration issues certificate of necessity for the following defense-connected industrial project: Garnet King Mining Co., Esmeralda County, \$125,761 for tungsten.

KENNECOTT UNCOVERS ORE—Kennecott Copper Corp. makes approximately 3,500,000 tons of copper ore available at its Kimberly Pit by removal of 12,000,000 tons of waste material.

OREGON

GLUE PLANT CHANGES HANDS—American-Marietta Co. acquires U. S. Plywood Co.'s glue manufacturing division at Portland, and is operating it under the name of Adhesive Products. American-Marietta plans to combine Portland research activities at its new plant in Seattle.

PRECISION CASTING FOR SMALL PARTS—First of its kind in Pacific Northwest area for precision casting of small parts from ferrous and non-ferrous metals, Precision Castparts Corp. starts operations in Portland. William Simpson is superintendent of plant operations and Edwin H. Cooley is general manager.

SPRINGFIELD ALUMINUM PLANT—National Metallurgical Corp. expects to award contract some time this month for construction of a \$500,000 aluminum plant at Springfield. Aluminum alloy will be produced from alumina clays mined near Cottage Grove.

HARVEY BUYS SALEM PLANT—Harvey Machine Co., Inc., Torrance, Calif., acquires the government-built experimental alumina plant in Salem, and will operate it as an experimental pilot plant for extraction of alumina from clays of the Columbia River Basin. Harvey is also planning construction of a reduction plant at The Dalles.

SHINGLE FIRM EXPANDS—Aluminum-Lock Shingle Corp. of America, Portland, plans plant expansion of an additional 7,000 sq. ft. Enlarged production lines, shipping, storage and warehousing are also planned.

UTAH

SALT LAKE TUNGSTEN REFINERY—Minerals Engineering Co. begins construction on a \$250,000 tungsten refinery in Salt Lake City. Plant will provide refining facilities for concentrates shipped in from firm's new tungsten concentrator now under construction at Glen, Mont., and for 60,000 tons of tungsten tailings stockpiled at plant site.

MERGER OF MINES—United Park City Mines Co. is formed by merger of Silver King Coalition Mines Co. and Park Utah Consolidation Mines Co., both of Utah's Park City area. New firm will have a capital stock of 6,000,000 shares at \$1 par value.

COLORIZER PAINT SYSTEM—Colorizer Associates, Inc., is composed of one foreign paint company and 13 domestic firms providing for production of more than a thousand different tints and shades which can be used for making practically any color of paint with a white or gray base. All fluid colorant used by these manufacturers must be purchased from Bennett's at Salt Lake City on a franchise basis.

WASHINGTON

CRYOLITE REFINERY—Reynolds Metals Co. plans to put in full operation at

its Longview plant a cryolite recovery facility to recover this substance in the aluminum reduction process. Cryolite will be saved both from plant fumes and carbon linings of aluminum potlines.

GRAPE JUICE PLANT CHANGES HANDS—Church Grape Juice Co. of Kennewick is purchased by Welch Grape Juice Co., Westfield, N. Y., for an undisclosed sum. Included in sale are plant, inventory and over 700 acres of land. Retail sales for Church firm have run over \$2,500,000 yearly.

EVERETT PLANT FOR SCOTT PAPER—Scott Paper Co., Chester, Pa., awards contract for construction of its Everett paper mill to Howard S. Wright Co., Inc., and American Pile Driving Co., Inc. Mill will directly adjoin the existing Soundview Division pulp mill, and will produce quality household paper products.

CHANGES AT BOEING—Boeing Airplane Co., Seattle, forms a pilotless aircraft division which will proceed "toward a less dependent status and may ultimately become autonomous." Responsibility for tool design, tool fabrication, production planning and manufacturing activities for both research and development, as well as production programs for pilotless aircraft, will be consolidated in this new division.

LONG-BELL PLANS PURCHASE—Long-Bell Lumber Co. of Longview and Missouri, offers to purchase controlling interest in Oregon-American Lumber Corp., Vernonia, Ore., from Central Coal & Coke Corp., Kansas City, for approximately \$6,200,000. Oregon-American's mill is backed up by company-owned forest lands containing more than 200,000,000 ft. of old growth Douglas fir and hemlock.

OIL TERMINAL FOR HILLYARD—The Phillips Petroleum Co.'s subsidiary, Petroleum Terminal Co., plans construction of an oil products terminal at Hillyard, adjacent to Salt Lake Pipe Co.'s extension from Pasco to Spokane.

WASHINGTON INDUSTRIAL PROMOTION—Longview Chamber of Commerce and other interested parties form Cowlitz County Industrial Bureau. Its purpose is as follows: (1) offer services to existing industries in their efforts to expand and develop new products and markets; (2) assist non-resident firms looking for industrial sites; (3) seek out industrial prospects, solicit their interest and follow up all contacts.

MORE COLD STORAGE—Glacier Cold Storage, Inc., Stanwood, is organized with \$200,000 capital and will store and freeze food, but not pack it. New organization has acquired plant of Snohomish County Dairymen's Association and will convert it into a facility with a 75-ton a day freezing capacity, and 15,000,000 lb. storage capacity.

ALCOA PLANS EXTRUSION PRESSES—Aluminum Co. of America plans to install two extrusion presses in the fabricating works of its Vancouver operations at a cost of \$2,700,000. New equipment will be capable of producing up to 3,000,000 lbs. of strong alloy blooms per month. Approximately 80,000 sq. ft. of manufacturing area will be provided in new extrusion plant buildings, and about 200 new jobs will be created.



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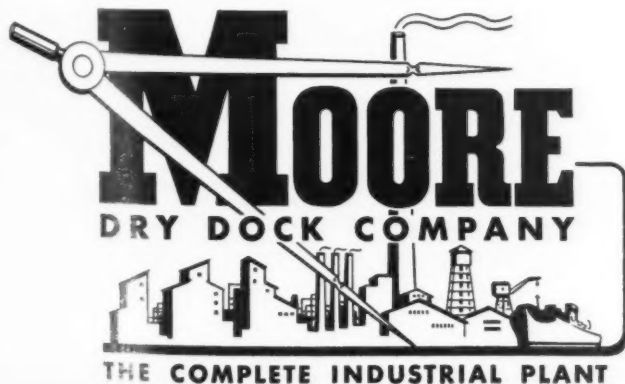
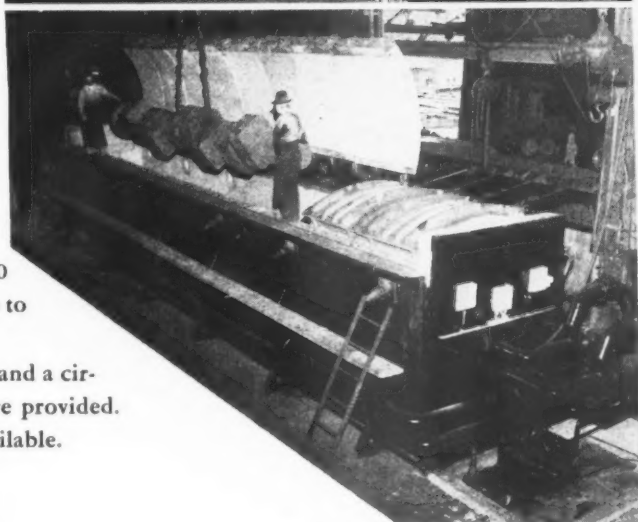
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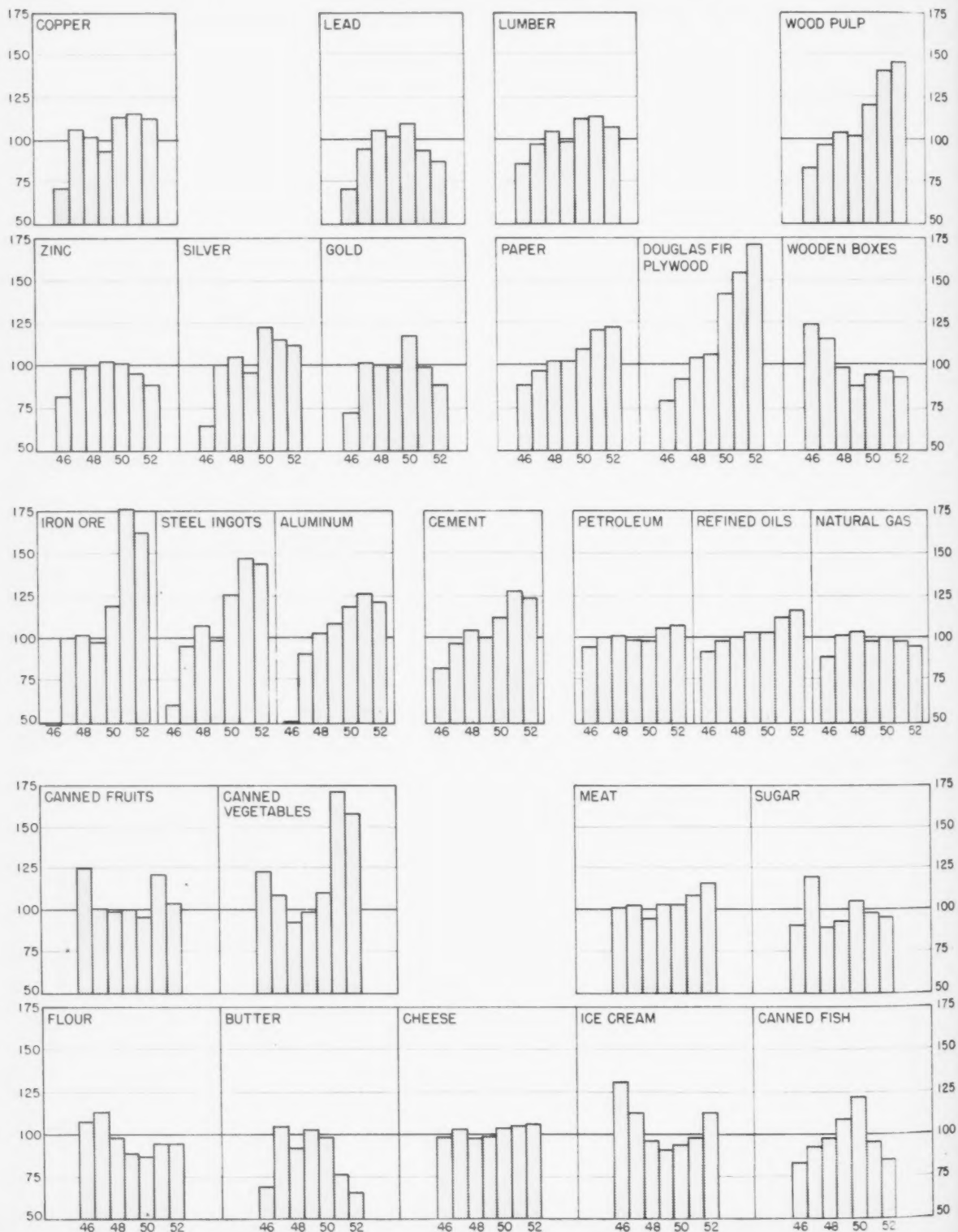
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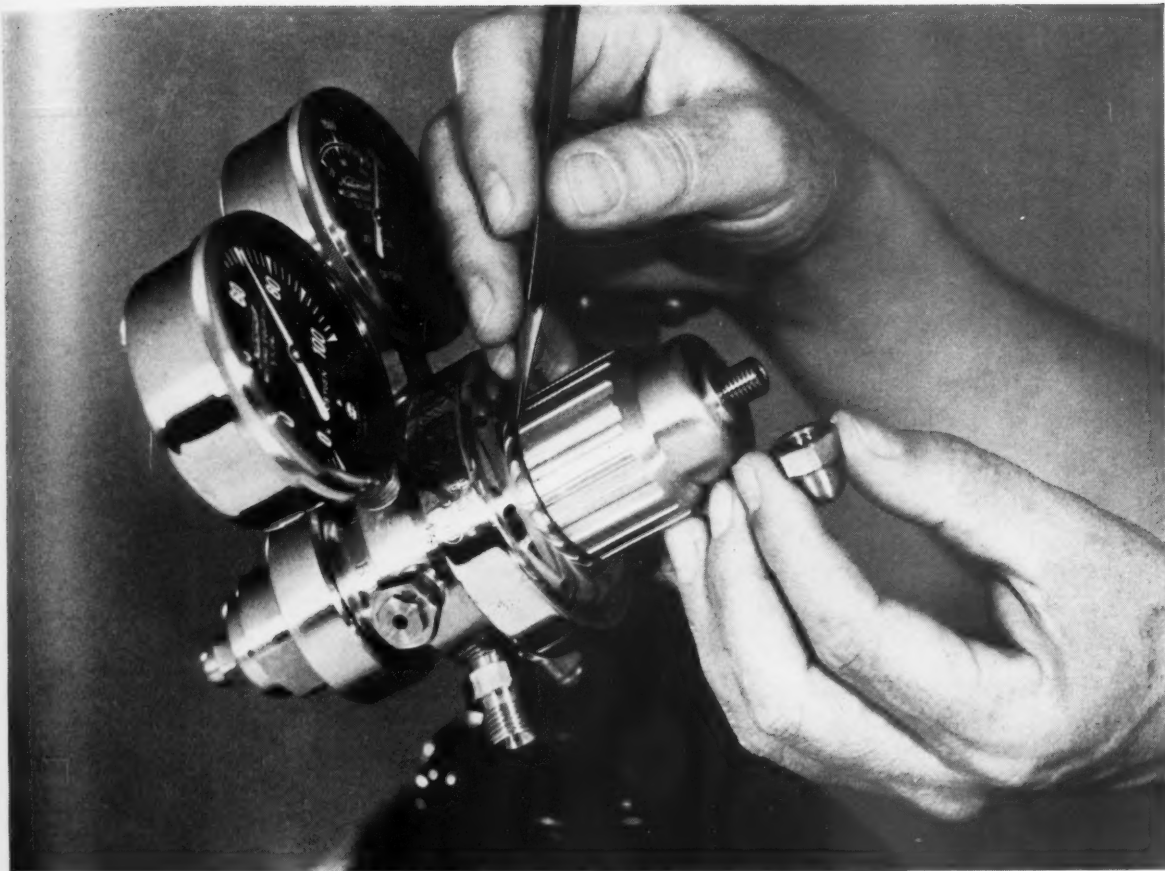
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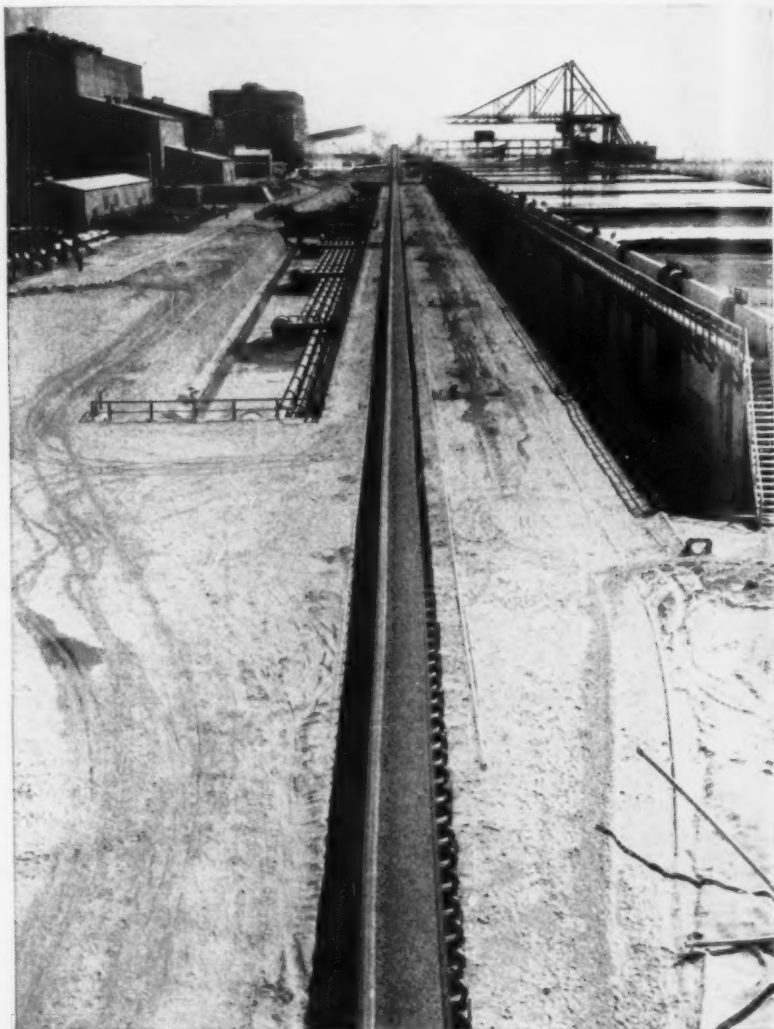
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